Periodical

JUNE, 1944

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DETROIT

INDUSTRIAL ARTS AND VOCATIONAL EDUCATION

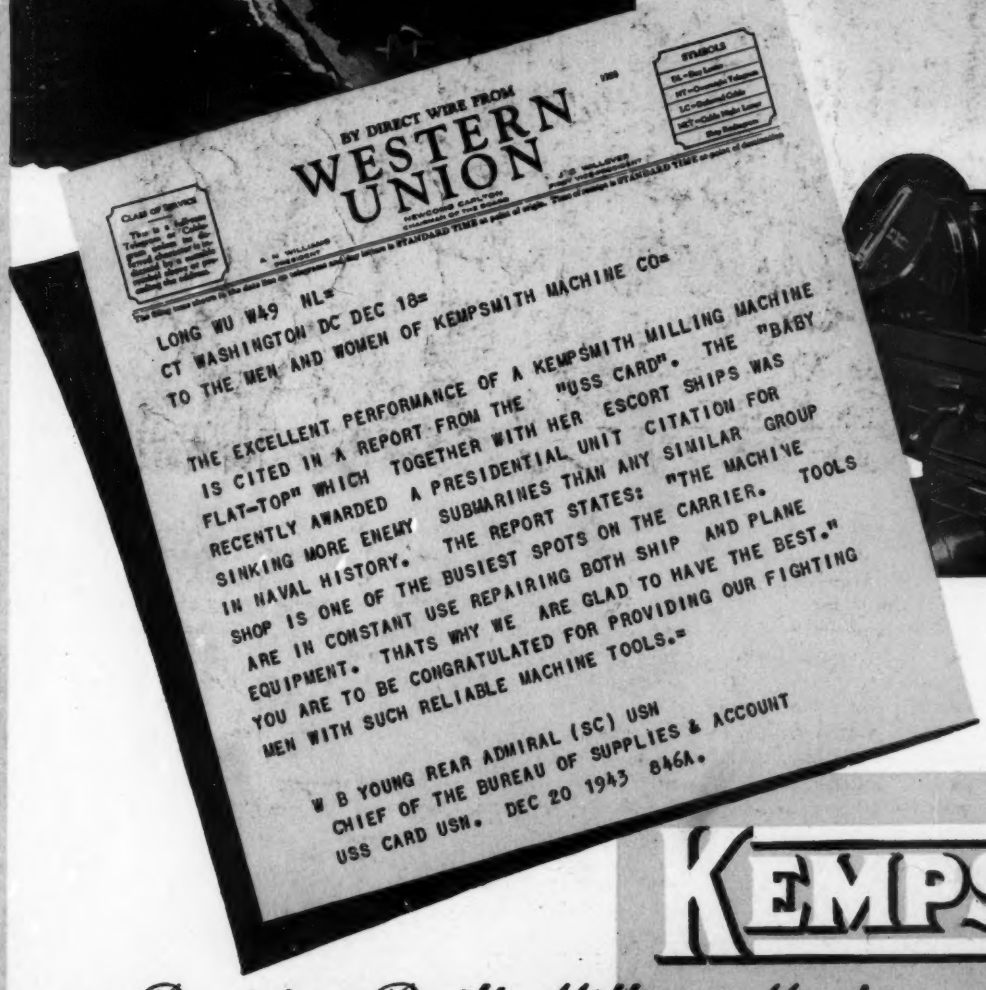
THE SHOP TEACHERS' PROFESSIONAL MAGAZINE

Helping Uncle Sam Sink Enemy Subs

Kempsmith Millers in Service on U. S. "FLAT TOPS" . . .

For 58 years, Kempsmith has been a world-wide by-word for America's supremacy in milling machines and a creditable factor in advancing the American way of life. Today, with our country at War, Kempsmith is doing its duty, both on the production front and on the fighting front. Rugged Kempsmith milling machines are being used in the manufacture of essential war equipment. And on the far-off fighting fronts, sturdy Kempsmith machines are maintaining and repairing this equipment. The Kempsmith Miller serving on the Carrier "U. S. S. Card" is a typical example. Kempsmith is proud of the citation shown below, and anxious to continue in the service of our nation.

The KEMPSMITH MACHINE CO.,
Milwaukee 14, Wis., U.S.A.

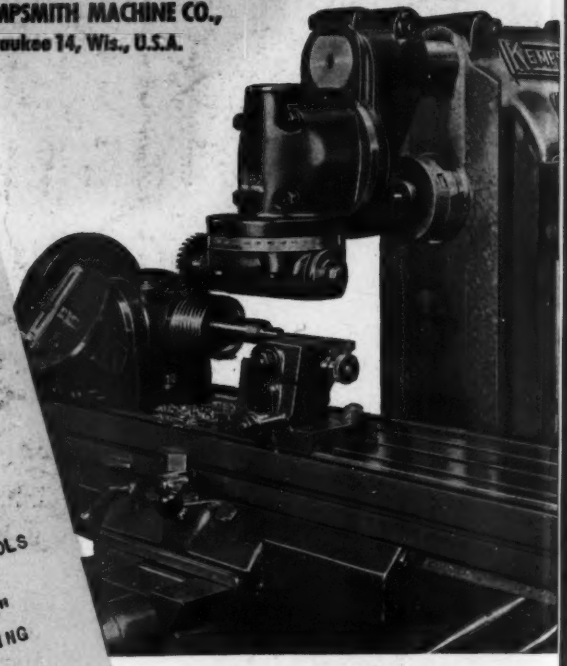


BY DIRECT WIRE FROM
WESTERN UNION

LONG WU W49 NL=
CT WASHINGTON DC DEC 18=
TO THE MEN AND WOMEN OF KEMPSMITH MACHINE CO=

THE EXCELLENT PERFORMANCE OF A KEMPSMITH MILLING MACHINE IS CITED IN A REPORT FROM THE "USS CARD". THE "BABY FLAT-TOP" WHICH TOGETHER WITH HER ESCORT SHIPS WAS RECENTLY AWARDED A PRESIDENTIAL UNIT CITATION FOR SINKING MORE ENEMY SUBMARINES THAN ANY SIMILAR GROUP IN NAVAL HISTORY. THE REPORT STATES: "THE MACHINE SHOP IS ONE OF THE BUSIEST SPOTS ON THE CARRIER. TOOLS ARE IN CONSTANT USE REPAIRING BOTH SHIP AND PLANE EQUIPMENT. THATS WHY WE ARE GLAD TO HAVE THE BEST." YOU ARE TO BE CONGRATULATED FOR PROVIDING OUR FIGHTING MEN WITH SUCH RELIABLE MACHINE TOOLS.=

W B YOUNG REAR ADMIRAL (SC) USN
CHIEF OF THE BUREAU OF SUPPLIES & ACCOUNT
USS CARD USN. DEC 20 1943 846A.



Thread milling a worm, using a Kempsmith Type "G" machine equipped with Hi-Speed Attachment, dividing head and spiral cutting mechanism.

KEMPSMITH

• Precision Built Milling Machines Since 1888 •

Teach
WAR PRODUCTION SKILLS *on*

THE LATHES THAT PRODUCE FOR WAR

TEACHING HELPS

South Bend teaching helps — books, sound films, wall charts, and bulletins on the care and operation of a lathe—are available for school shop instruction. Write for Circular No. 21-C.

As more and more men are called for service with the armed forces, industry's problem of securing proficient new workers becomes increasingly difficult. And it is the responsibility of our schools to train many of these replacements.

New workers can be trained better and more quickly when the lathes on which they are trained are counterparts of those they will operate in war production plants. This reduces costly on-the-job training, less work is scrapped, and production is speeded up.

The wide use of South Bend Lathes in industry makes them a logical choice for pre-employment training. In addition, their features make them popular with both instructors and trainees. The easily operated controls, safety features, accuracy, and versatility of these lathes make it easier for beginners to acquire a working knowledge of metal turning in a short time.

There is a South Bend Lathe for almost every training requirement. They are made in five sizes, 9" to 16" swing. Write for a copy of our catalog.

BUY WAR BONDS

SOUTH BEND LATHE WORKS

LATHE BUILDERS FOR 37 YEARS • SOUTH BEND 22, INDIANA

FOUR FIGHTING FILES CAN FREE A FIGHTING MAN

DELTA FILES

DELTA

DELTA FILE WORKS, Inc.
Philadelphia 37, Pa.

SURE, there are lots of other important reasons for using Delta Files. But today the most important reason by far is this fact, proved by actual scientific tests: *Delta Files will do on the average 25% more work in the same time with the same effort.*

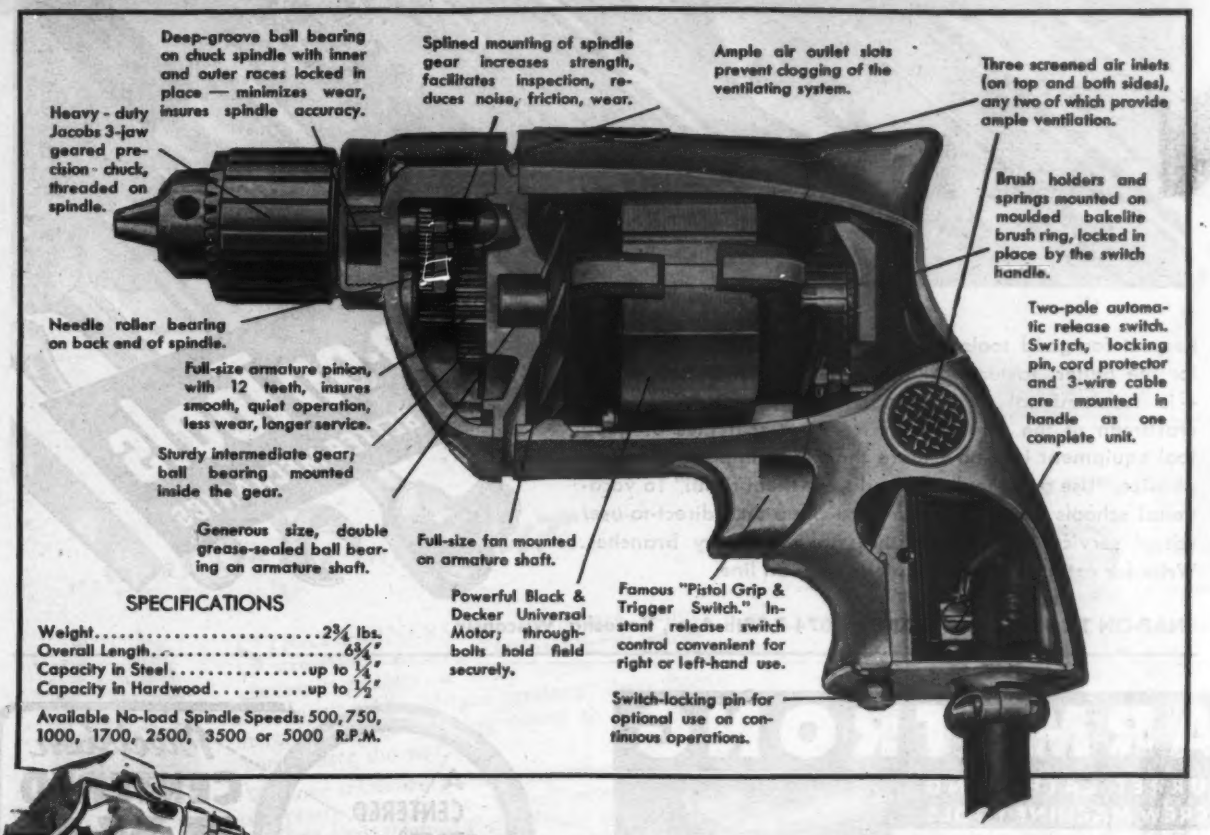
Think of it! Four men filing with Delta Files can do the work of five. Yes, four fighting files can free a fighting man.

The reason? Delta's teeth are hard and sharp. They cut away the tough, solid metal. They bite quick and clean —and deep.

Show your students how to get *full capacity* out of their time—by using *full capacity* tools. Tell them about Delta, the fighting file, the file that does 25% more work with no extra effort.

MAKE THIS TEST: Clamp a bar (say 1 inch square), upright in a vise. Cut a hole in a sheet of paper to fit over the bar. Take 50 or 100 strokes with a Delta, each side, and collect the filings. Do the same with your present file. Now, weigh the filings. The difference is likely to surprise you.

The Service you get out of tools depends on what's *built into* them


Deep-groove ball bearing on chuck spindle with inner and outer races locked in place — minimizes wear, insures spindle accuracy.
Splined mounting of spindle gear increases strength, facilitates inspection, reduces noise, friction, wear.
Ample air outlet slots prevent clogging of the ventilating system.
Three screened air inlets (on top and both sides), any two of which provide ample ventilation.
Heavy-duty Jacobs 3-jaw geared precision-chuck, threaded on spindle.
Brush holders and springs mounted on moulded bakelite brush ring, locked in place by the switch handle.
Needle roller bearing on back end of spindle.
Two-pole automatic release switch. Switch, locking pin, cord protector and 3-wire cable are mounted in handle as one complete unit.
Full-size armature pinion, with 12 teeth, insures smooth, quiet operation, less wear, longer service.
Sturdy intermediate gear; ball bearing mounted inside the gear.
Generous size, double grease-sealed ball bearing on armature shaft.
Full-size fan mounted on armature shaft.
Powerful Black & Decker Universal Motor; through-bolts hold field securely.
Famous "Pistol Grip & Trigger Switch." Instant release switch control convenient for right or left-hand use.
Switch-locking pin for optional use on continuous operations.

SPECIFICATIONS

Weight.....2¾ lbs.
Overall Length.....6¾"
Capacity in Steel.....up to ¼"
Capacity in Hardwood.....up to ½"

Available No-load Spindle Speeds: 500, 750, 1000, 1700, 2500, 3500 or 5000 R.P.M.

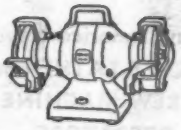
Look Inside the Black & Decker Holgun —the World's Most Widely Used Electric Drill

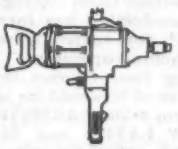
ABOVE you see some of the built-in reasons why the Black & Decker Holgun is the most popular electric drill in the world. And those built-in reasons are typical of the unseen values you get when you buy any Black & Decker Tool.

You get a product of engineering leadership and precision workmanship. You get a tool in which each part is specifically designed and made for the particular job it has to do. You get, for example, gears designed and cut by Black & Decker . . . and checked on precision testing equipment to insure a smooth and noiseless flow of power from motor to chuck.

Train your students in the shop with Black & Decker Tools . . . the same tools they'll most likely use when they graduate to industry. Then they'll be started *right* . . . with an appreciation for fine tools as well as quality production.

For help in selecting tools for training . . . tools that will *last* . . . call your nearby Black & Decker Distributor. The Black & Decker Mfg. Co., 780 Pennsylvania Avenue, Towson-4, Maryland.


BENCH GRINDERS


NUT RUNNERS

PORTABLE SANDERS

ELECTRIC SAWS

LEADING DISTRIBUTORS EVERYWHERE SELL

Black & Decker

PORTABLE ELECTRIC **TOOLS**

Respect for good tools — and keen appreciation for the better, faster workmanship they deliver — is fundamental in training the productive craftsmen of the future. With war-time scarcities of good tool equipment it is now more than ever important to emphasize, "Use good tools . . . **and treat them right!**" To vocational schools throughout America Snap-on's direct-to-user school service is available through 35 factory branches. Write for catalog of the complete Snap-on line.

SNAP-ON TOOLS CORPORATION, 8074-F 28th Ave., Kenosha, Wisconsin

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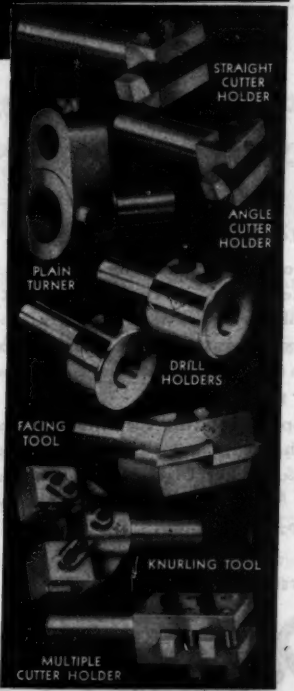
ARMSTRONG

TURRET LATHE AND SCREW MACHINE TOOLS

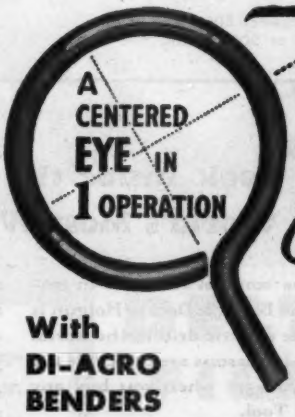


Today, America Needs TURRET LATHE and SCREW MACHINE OPERATORS

The transition from tooling-up to all-out production has increased the need for turret lathe and screw machine operators. When preparing your courses to help fill this need it would be well to build them around ARMSTRONG TURRET LATHE and SCREW MACHINE TOOLS. These are provided for the basic operations, and take standard drills and knurls or cutters that anyone can quickly grind from stock shapes of high speed steel. Permanent, multi-purpose tools, they reduce tooling-up to the selection of cutters, adjustment for clearance and tightening of set screws.

Write for catalog C-39a

ARMSTRONG BROS. TOOL CO.
"The Tool Holder People" 322 N. Francisco Ave., Chicago, U. S. A.
Eastern Warehouse & Sales: 199 Lafayette St., New York



Precision **CENTERED EYE** *Bending*

With DI-ACRO BENDERS

DI-ACRO Precision Bending is accurate to .001" for duplicated parts. DI-ACRO Benders bend angle, channel, rod, tubing, wire, moulding, strip stock, etc. Machines are easily adjustable for simple, compound and reverse bends of varying radii.

Send for CATALOG

"DIE-LESS" DUPLICATING showing many kinds of "Die-less" duplicating produced with DI-ACRO Benders, Brakes and Shears.

The DI-ACRO Bender makes perfectly centered eyes from rod or strip stock at high hourly production rates. Both eye and centering bend are formed with one operation. Any size eye may be formed within capacity of bender and ductile limits of material.

DI-ACRO Bender No. 1

Forming radius 2" approx Capacity $\frac{1}{4}$" round cold rolled steel bar or equivalent. Also Benders No. 2 and 3 with larger capacities

DI-ACRO PRECISION MACHINES DIE-LESS DUPLICATING

O'NEIL-IRWIN MFG. CO.

351 EIGHTH AVE. SOUTH · MINNEAPOLIS 15, MINN.

INDUSTRIAL ARTS AND VOCATIONAL EDUCATION, June, 1944, Volume 33, No. 6. Published monthly, except during July and August, by The Bruce Publishing Co., Milwaukee 1, Wis. Entered January 2, 1914, as Second-Class Matter at Milwaukee 1, Wis., under Act of March 3, 1879. Subscriptions — U. S., $2.50 per year. Canada and Foreign, $3.00. Single copies, 35 cents.

What will your †† *future* **I.P.** *be?*

This is the Fourth of a series of advertisements presenting "Industrial Par" and its importance to your company in all future planning. Save this and succeeding I.P. advertisements as the basis for discussion and as a guide to your planning program.

Dream Products?

...WE'RE ALL FOR THEM *But*

STRATO-LINERS, tear-drop cars, streamlined passenger trains, pre-fab houses, electronic gadgets in every home, helicopters and many other "dream products" have been heralded as the stepping stones to new prosperity after the war.

Without minimizing their importance, we feel these things to be still pretty much in the "dream" stage. There's no question in our minds that they will contribute substantially to our world of tomorrow — many of America's great industries, providing work and wages for millions, had their origins in the ideas, experiments and vision of creative, imaginative men — but such things take time to develop.

The gap between wartime production and peacetime manufacturing will most likely be shortened by the making of prosaic things — things we already have and use which war either suspended or curtailed.

One doesn't have to be a crystal-ball gazer to realize that the peacetime future isn't so unpredictable after all. Those manufacturers who are pointing their postwar planning to the production of quality products — in quantity — at low cost — can be quite sure of being among those "most likely to succeed" in the peacetime to come.

To accomplish that objective, machine tools — the most modern and advanced types — are indispensable.

For only with the most modern machine tool equipment can manufacturers hope to attain or excel national industrial par—the vitally significant situation which all must face as summarized in the panel "Spotlight Facts for Your Future I. P. Planning." And only as *industrial par* is maintained or excelled by industry as a whole can a high level of national prosperity — its benefits in terms of jobs and wages for the greatest number of workers — be achieved.

Let's all Back The Attack! **BUY MORE BONDS**

Spotlight facts for your future **I.P.** *planning*

* Production methods — developed in wartime —increase man-hour output; pent-up buying power — released in peacetime — demands increased production.
* The rate of 2½% increase per year output per man-hour, established by a 12 year record of industrial production, can be expected to reach at least 4% per year — compounded.
* Manufacturers must set a goal of 50% increased output per man-hour every 10 years — to maintain a high level of national prosperity and achieve its benefits in terms of security of jobs and wages for the greatest number of workers and the volume production of more goods for more people at lowest cost.
* Machine tools — the most modern, most efficient — are recognized as the most effective implements of mass production and increased output at lowest cost — but only continual replacements with the newest and finest machine tools assures full productive capacity. *Such replacements yearly should be equal to 10% of the total machine tool investment — in keeping with increased output.*
* The cost of machine tools is insignificant in terms of their productive power . . . from 1927 to 1937, according to census reports, American manufacturers had only a total of about 2% invested yearly in machine tools in ratio to a total volume of 9 billion dollars' worth of production annually.

†† **Industrial Par** — *the constantly increasing output per man-hour equal to approximately 50% every 10 years.*

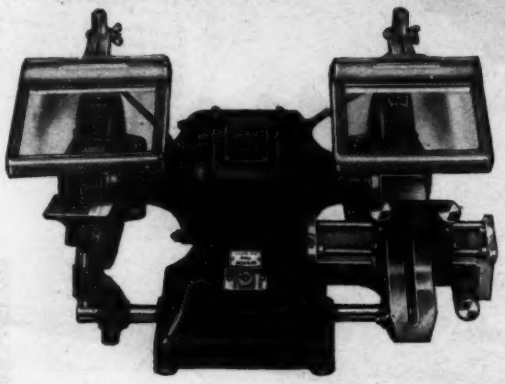
KEARNEY & TRECKER CORPORATION

MILWAUKEE 14 WISCONSIN

Milwaukee Machine Tools

THE advertisement above is reproduced from our current advertising campaign appearing in the business and industrial press. We believe these advertisements should be of interest and value to the young men who are being trained for tomorrow's industry, in terms of the trend and importance of machine tools to the industrial world of the future. May we suggest that you clip this advertisement and post it in your classroom or bulletin board so that it is brought to the attention of your students.

RIGHT GRINDING EQUIPMENT



THE STANLEY No. 677 GRINDER

A *safe* edge tool grinder especially designed for school shops. Makes it easy to teach proper grinding of Plane Irons and Chisels.

Equipped with 1725 R.P.M. heavy duty fully enclosed motor, dust sealed ball bearings, guarded wheels, plane iron and chisel grinding fixture, "FLUD-LITE" Safety Eye Shields. Write for specifications.

. . . for your present Tool Grinders . . .

Assures effective eye protection, better vision, and improved work. Two light bulbs with reflectors floodlight the work, provide *30% more visibility*.

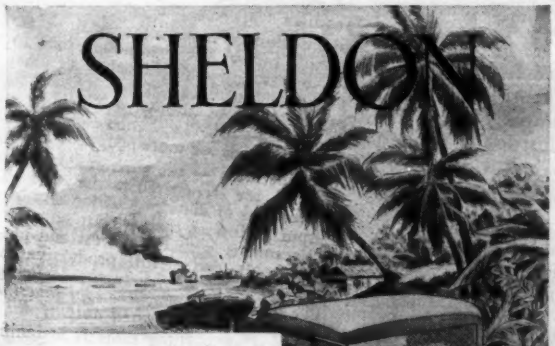
Adjustable, to suit operator's position . . . cannot be moved to non-guarding position. Can be attached to any grinder equipped with wheel guards. Ask your Stanley distributor, or write for details.

STANLEY

STANLEY *Electric* TOOLS

EDUCATIONAL DEPARTMENT, STANLEY ELECTRIC TOOL DIVISION
THE STANLEY WORKS, NEW BRITAIN, CONN.

SHELDON



In the MARINE TRADITION!

Machines and machine tools as well as men must measure up to MARINE CORP standards before acceptance . . . must be capable of handling whatever situation arises. That is why we are proud that SHELDON LATHES were selected for the Marine Trailerized Machine Shops as well as for the Army's "Mobile Machine Shop" and Mobilized Instrument Repair Ship Units," and as the maintenance lathes for many Navy craft.

Modern battle equipment requires precision machinery. Operation under battle conditions requires rugged, reliable and dependably accurate machine tools. In SHELDON Precision Lathes all of these requirements are fulfilled.

Write for Catalog

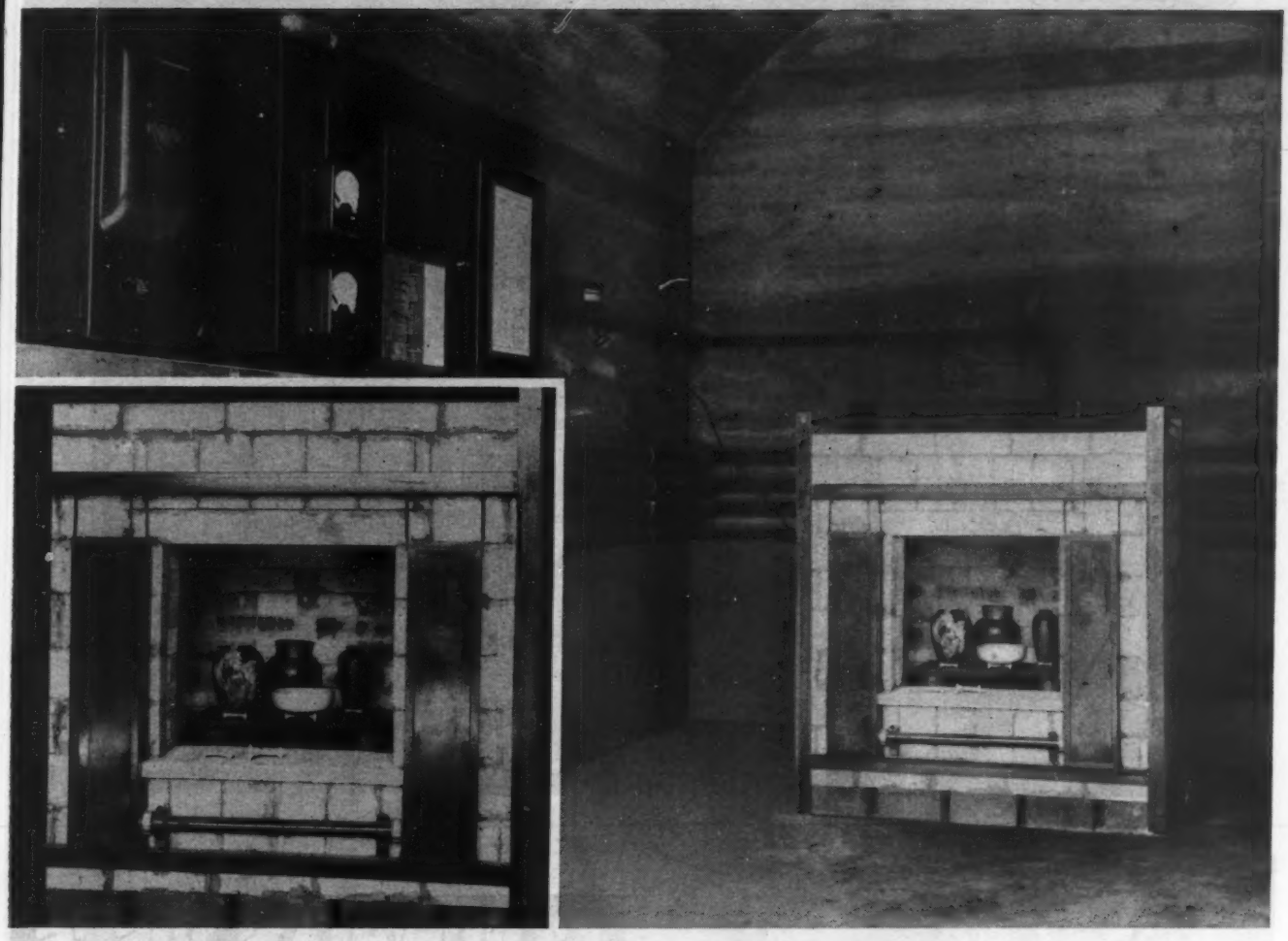
Sheldon Machine Co., Inc.
4246 N. Knox Ave.
Chicago 41, U. S. A.

Tannewitz DI-SAWS

Most Essential Requirement for Your Machine Shop!

With this extremely versatile machine, tools and dies, machine parts or other items of practically any shape may be made in the minimum of time from steel or any other material; for it provides for inside and outside sawing, using blades 3/32" to ½" wide, chain filing — in three different file widths, and endless belt polishing. Because of this great versatility as well as the fact that these machines are being widely used in machine shops throughout the country where they are obsoleting other methods, a TANNEWITZ DI-SAW should be the number one item to be purchased for your school shop. Complete details furnished on request. Just ask for DI-SAW Bulletin.

THE TANNEWITZ WORKS, GRAND RAPIDS, MICH.



A "GLOBAR" KILN THAT CONTRIBUTES TO THE CURE

Known the world over, among institutions of its type, is the famed Trudeau Sanatorium at Saranac Lake, New York.

Occupational therapy plays an all important part as an outlet for the tendencies and talents of many of the patients—an outlet that contributes materially to their cure.

One artistic group centers its interest in the creation of art pottery ware—and they entrust the firing of their precious pieces to a "Globar" equipped electric kiln.

They tell us that the little kiln performs admirably in turning out bisque and glost firings—it's so reliable—so easy to operate—and of importance is its economy.

The kiln loading zone is 18″ high, 21″ deep and 20″ wide.

It consumes 115 kilowatt hours of energy in firing to cone 03 down, in eight hours.

The kiln assures perfect temperature control—uniform firing under clean, fumeless conditions—all of which is conducive to the production of perfect ware.

Complete data on the operating characteristics of this kiln is available to those interested. The Carborundum Company, Globar Division, Niagara Falls, New York.

"Globar" Heating Elements by CARBORUNDUM
TRADE MARK

(Carborundum and Globar are registered trade marks of and indicate manufacture by The Carborundum Company)

NORTON ABRASIVES

WHEN SCHOOL RE-OPENS

This month we are mailing announcements to our entire list of Instructors telling them that our first fall feature for the 1944-45 school year will be a 14 x 18" colored Wall Chart describing Coated Abrasives and clearly indicating their preferred applications.

As usual, this will be *free of charge* to all Instructors who ask for it.

The "know how" of Coated Abrasive usage as well as that of Oilstones is one of our contributions to the war effort. Because of the able help of Instructors everywhere, we pledge our continued support of this enterprise.

BEHR-MANNING—EDUCATIONAL DEPARTMENT—TROY, N. Y.

LUFKIN DIVIDERS AND CALIPERS

FOR QUICK, ACCURATE TRANSFER

In the school shop it pays to have good tools—especially when, like Lufkin, those tools are identical with those used by best mechanics and engineers in industry. In these Lufkin spring Dividers and Calipers special steel, hardened points and the stiff flat bow spring insures reliability. Available with either solid nut or "Quick Nut."

For quickly and accurately transferring measurements you can't beat Lufkin Dividers and Calipers.

TEACH GOOD WORKMANSHIP WITH GOOD TOOLS

LUFKIN

SAGINAW, MICHIGAN · NEW YORK CITY

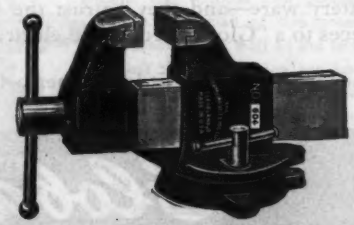
TAPES · RULES · PRECISION TOOLS

COLUMBIAN VISES

INDUSTRY'S FIRST CHOICE FOR OVER THIRTY YEARS

Columbian Continuous screw Woodworker's vises are furnished with hard wood handles — or may be equipped with ADJUSTABLE STEEL HANDLES, as above, to eliminate handle breakage, speed operation and provide extra leverage.

The complete line of Columbian Vises is designed to excel in its field — all are made to the same high standard of engineering and workmanship. A vise for every need and purpose.



Awarded April 8th, 1943
Star added Oct. 8th, 1943

Columbian Machinist's Vises are made of malleable iron castings, guaranteed unbreakable, and designed to provide accurate, dependable equipment for school and industrial shops. All standard types.

THE COLUMBIAN VISE & MFG. CO.

9022 BESSEMER AVENUE CLEVELAND 4, OHIO

THE WORLD'S LARGEST MAKERS OF VISES

Walker-Turner Machine Tools Are EASIER on Budget Student and Teacher

METAL-CUTTING RADIAL MACHINES — Transverse travel of 21½" enables operator to cut wide material and various shapes. Patented geared motor makes possible use of small diameter wheels.

BAND SAWS—14" and 16" models. Back gearing and cone pulley provide speed range from 61 to 5300 s.f.m. for cutting practically any material from tool steel to wood.

20 INCH DRILL PRESSES—Hand or power feed, in bench, floor and multiple spindle models. Spindle speeds 260-5200 r.p.m. Capacity 1" in cast iron, ¾" in steel.

CHECK vocational schools using Walker-Turner Machine Tools and you'll find that their popularity is a three-way proposition.

Students **like the safe, simplified design which makes for easy, accident-free operation.** ***Instructors*** **favor the wide range of cutting speeds and great flexibility which fit them for a variety of projects — the ruggedness that is so necessary with "green operators" — the simplicity which enables students to concentrate on the project rather than the machine. And the men who plan school** ***budgets*** **root for them because Walker-Turner Machine Tools give thorough industrial training at prices kept low through thoughtful design, careful selection of materials, and assembly line production methods.**

Proven on thousands of machining applications in Industry, Walker-Turner Machine Tools are promptly available for war production training. Write today for our latest catalog.

WALKER - TURNER COMPANY, Inc.
Plainfield, N. J.

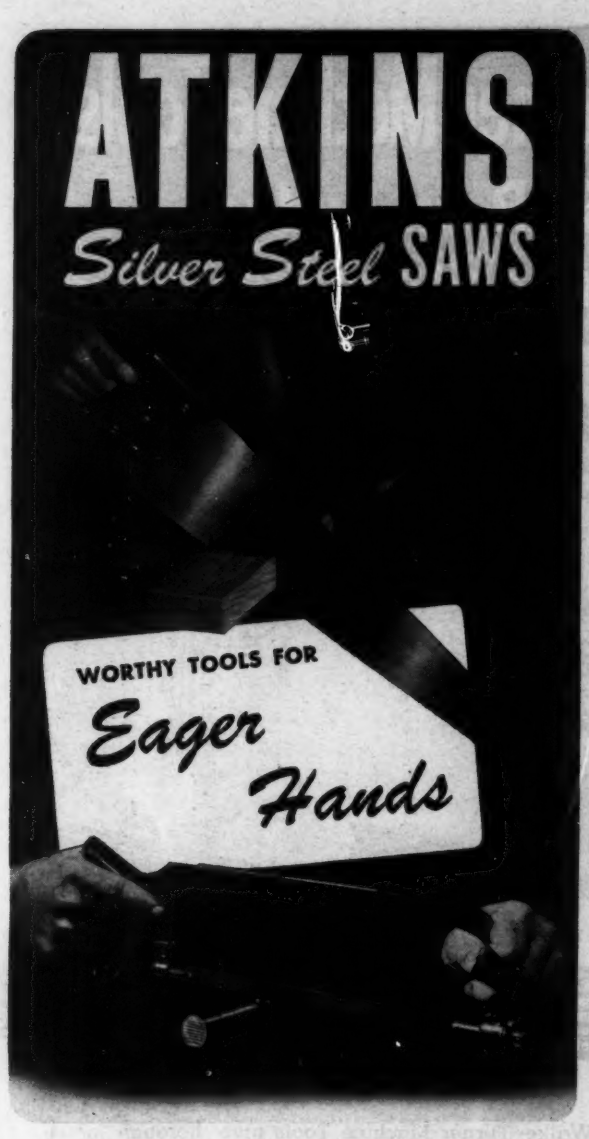
3- 107

walker-Turner COMPANY, INC. PLAINFIELD, N.J. U.S.A.

MACHINE TOOLS

DRILL PRESSES — HAND AND POWER FEED • RADIAL DRILLS
METAL-CUTTING BAND SAWS • POLISHING LATHES • FLEXIBLE SHAFT MACHINES
RADIAL CUT-OFF MACHINES FOR METAL • MOTORS • BELT & DISC SURFACERS

ATKINS
Silver Steel SAWS



● For a pupil just starting manual training, the craft he chooses represents a new world to conquer. His eagerness to win mastery over that craft, can be stimulated and retained only by access to good tools. If, like Atkins Silver Steel Saws, they are correctly designed, they make it easier for him to turn out satisfactory work even in the early stages. If, like Atkins Saws, they hold a keen cutting edge for longer periods, they make learning a pleasanter task. And if, like Atkins Saws, they can stand up under the rough and ready handling to which school equipment is often subject, they're easy on the budget.

Get Atkins FREE Chart on Saw Filing

The right way of filing and setting saw teeth illustrated in detail on 19" x 25" wall chart. Send for a free copy today.

E. C. ATKINS AND COMPANY
404 S. Illinois St., Indianapolis 9, Indiana
Agents or Dealers in All Principal Cities the World Over

OLIVER

"OLIVER" NO. 191
TILTING ARBOR SAW BENCH
"The Handiest Circular Saw Bench for All Kinds of General Small Work"

The Oliver Tilting Arbor Saw Bench is a very practical saw for school shop use.

It tilts for angle sawing and can be lowered or raised for depth cutting. Table always remains at natural height. Equipped with effective safety guards and built to the "Oliver" standard of quality.

Write for complete information on this and other "Oliver" woodworking machinery.

OLIVER MACHINERY COMPANY
GRAND RAPIDS . . . . . MICHIGAN

BURRILL'S
Paramount Band Saws

Your students should be provided with *BAND SAW BLADES* which have been adopted as being able to stand the stiff requirements of War Production Plants.

Accurately made Band Saws of extreme toughness enables more work to be produced in less man hours.

All sizes are carried in stock for prompt shipment.

Exclusive Band Saw Manufacturers.

PARAMOUNT SWEDISH BANDS
ACCURATELY SPACED TEETH
NO CRUSHED POINTS - GUARANTEED

BURRILL SAW & TOOL WORKS
ILION, N. Y.

GOOD TOOLS
for School Shops
Write for Catalog No. 34 showing STANLEY TOOLS for all School Shops
STANLEY TOOLS
FOR WOODWORKING AND FARM SHOPS
The most complete line offered by one manufacturer.
FOR ELECTRICAL SHOPS
Hammers, Bit Braces, Bit Extensions, Screw Drivers, etc.
FOR SHEET METAL SHOPS
Hammers, Chisels, Punches, etc.
FOR AUTOMOBILE SHOPS
Body and Fender Tools, Hammers, Chisels, Punches, Screw Drivers, etc.
FOR MACHINE SHOPS
Hammers, Rules, Chisels, Punches, Levels, etc.
FOR FORGE SHOPS
Anvil Tools, Tongs, Hammers, etc.
Visual Teaching Aids and Project Plans at cost.
STANLEY TOOLS
DIVISION OF THE STANLEY WORKS
Educational Dept., New Britain, Conn.
STANLEY

Two important new books for basic radio training—

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RADIO: FUNDAMENTAL PRINCIPLES AND PRACTICES

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INDUSTRIAL ARTS and VOCATIONAL EDUCATION

VOL. 33 JUNE, 1944 Number 6

To Our Readers

INDUSTRIAL ARTS AND VOCATIONAL EDUCATION wishes the best of luck to all of its readers, no matter where they may be this summer.

Your New Address

INDUSTRIAL ARTS AND VOCATIONAL EDUCATION is not published during July and August; hence, it will serve no useful purpose to send us your summer address. If you are changing positions, however, be sure to send us your change of address, and kindly remember to include your zone number.

A postal containing the following information, mailed to us promptly, will suffice.

Gentlemen: Send my fall copies of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION to the following address or addresses:

August 15 (September issue) to:

September 15 (Permanent address) to:

Present mailing address:

Signature: ---

This Month's Cover

The picture on the cover shows a student in one of the industrial-arts laboratories at Chicago, Ill., testing a motor which he has built.

Photograph submitted by Dr. Louis Newkirk, Director, Bureau of Industrial Arts.

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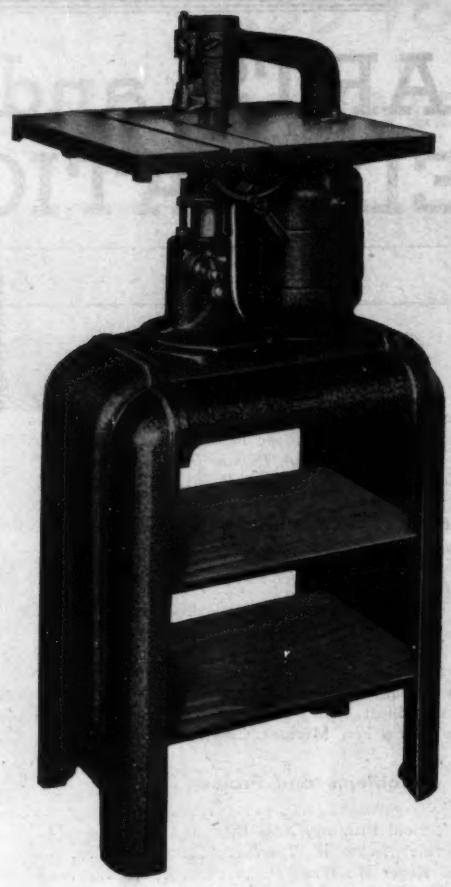

W-110 SHAPER

It's the shaper, perhaps more than any other machine, that gives school shop projects a professional appearance. Although a certain degree of skill is required in the operation of any machine of this kind, the Yates-American W-110 Shaper has many convenience features which make this work much easier.

Most outstanding of these is the tilting table which enables you to cut bevels and intricate mouldings with standard shaper knives. The table is hinged at the working surface — there is no gap at any angle.

The infeed platen on the inside fence is adjustable to the cutting circle. This eliminates the gap at the knives and permits safe shaping of end-grained pieces.

Original on this shaper is the use of a spring-loaded chip-breaker in conjunction with an outside holdover fence. With this equipment, the W-110 Shaper can do the work of a surfacer on lighter stock.

Other factors which make a definite contribution to the easy operation of this machine are the smoothly finished table and the high operating speeds (8000 and 10,000 R.P.M.) Both are essential to producing clean, smooth work — with a minimum of effort.

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No. 54 of a Series

SHORT TALKS ON WOOD

CATALPA (*Catalpa speciosa*)

Sometimes called the Indian Cigar Tree. Also known incorrectly as the "catawba". The wood is light, soft, somewhat weak and coarse-grained. Is very durable in contact with soil. Seasons well, is easily worked and takes a good finish. Light brown in color.

The wood of this tree makes excellent fence posts. Is also used for telegraph and telephone poles, fuel, general construction and occasionally for railroad ties.

Originally it was found only in the Mississippi valley from Illinois to Arkansas, but now it grows quite generally throughout the entire country except in the extreme north. Prefers deep, rich, moist soil and an abundance of light. Quite rapid in growth. Used considerably for shade and ornament.

A medium-sized tree averaging about 40 to 50 feet in height. May reach 100 feet in some localities. Diameter is about 12 to 15 inches. Usually has a short trunk and a broad, rounded open crown. Root system is deep and spreading.

The bark is thick, scaly and light brown in color. The leaves are simple, opposite, heart-shaped and are about 6 to 10 inches long. Bears clusters of attractive, fragrant, white blossoms in May or June. The fruit is a slender, bean-like pod about ½ inch thick and 6 to 15 inches long which hangs on the tree through the winter. When it splits open the winged seeds contained inside are freely scattered by the wind.

YATES-AMERICAN

How Marine Aviation *Paper-work* Men Are Trained

CAPT. ARTHUR A. ENGEL*

Most officers readily admit that the backbone of any military organization is the administrative noncommissioned officers. But particularly in aviation, officers' days are so filled with flying that they are unable to devote the necessary time to important and vital paper work.

Upon the shoulders of highly trained and well-disciplined enlisted men falls that responsibility. The men, graduates of supply or clerical schools at the Naval Training Station, San Diego, Calif., are ready to step into key Marine Aviation squadron positions after 16 weeks' intensive *paper work personnel* training and post-graduate boot camp. Commanded by Major Evans Spalding, it is the place first sergeants are born.

The average individual entering either one of the two schools has been in the Marine Corps only three months. He is just out of boot camp and transferred to Marine Aviation at the Marine Corps Air Depot, Miramar, Calif., where he is classified.

If his background, aptitude, and inclination indicate administrative capabilities, he goes to the Marine Aviation detachment school at the training station. Anything that he may have missed at boot camp, he will receive at Major Spalding's school. The Major, a line company veteran of the first war, adheres to the policy of *instantaneous obedience,* a policy reflected in the taut ship he commands.

Dungarees are uniform of the day, but what dungarees! Every man looks as neat as if he were standing inspection in freshly pressed greens. Units march to and from classes with a military bearing seldom equaled anywhere in the corps. Every man gets a haircut at least once a week and hair is never uncombed. In fact, Colonel S. E. Ridderhof, Chief of Staff of Marine Fleet Air, West Coast, who was invited to inspect the organization recently, declared that never had he the pleasure of reviewing such smart-looking troops. It is the commanding officer's contention that his men will be the leaders of their units and as such they should be fitted to do the job correctly.

In Marine Aviation, where a certain informality often prevails, it is rumored that a Spalding trained man can always be recognized — merely by the way he carries himself. Naturally, the men are ready to state that the schools are a tough grind; but they are just as ready to state their pride in being a graduate.

Although the way is hard and the courses difficult, the Major's methods are justified. He ruefully admits that at one time percentage of failures was nearly one and one half per cent. At the present it is less than one half of one per cent.

Working days are long, regulations are rigidly enforced, but a look at the school's record shows no man on report for more than 30 days. In addition to strict military discipline and long days of study, each man does an hour of combat conditioning each morning. The disparaging appellation *office pinky,* often given service-desk workers, is a misnomer here.

Although one other supply school trains men for Marine Aviation, the clerical school has no counterpart. From there stems all of aviation's clerical personnel so trained. Originally the schools were located at Toledo, Ohio, the supply branch being inaugurated in April, 1942, and the clerical institution soon after under the tutelage of Navy instructors. Major Spalding took command in August, 1942, and in October of that year the organization began a piecemeal transition to the west coast, finally getting under way at its present location in mid-December.

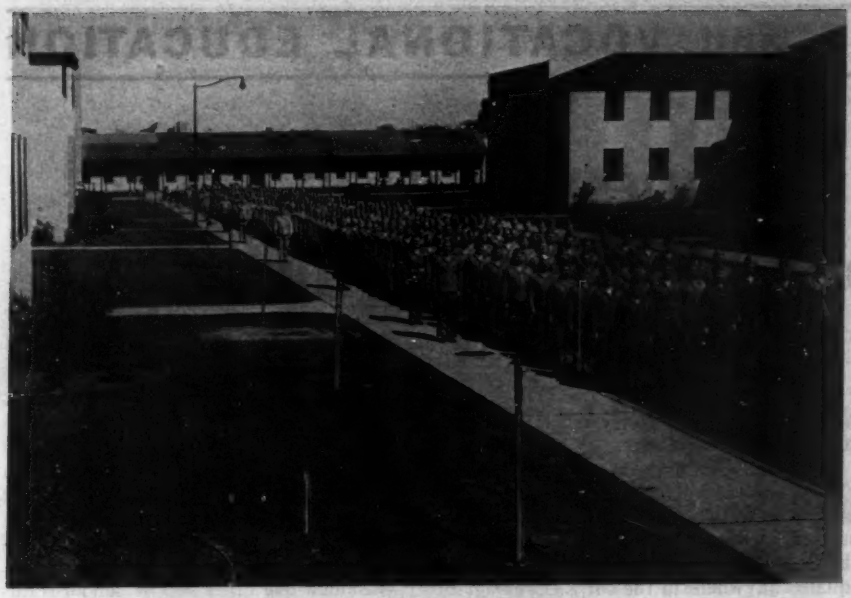
The institution, almost lost in the enormity of the vast Naval Training Station, is a part of the Navy School System and for that reason is located there.

With the administrative assistance of Warrant Officer A. D. Taylor, commanding officer of the clerical school; Warrant Officer James H. Kates, commanding the supply school; Warrant Officer Harold F. Merritt, quartermaster clerk; and 33 noncommissioned officer instructors, Major Spalding is supplying paper-work personnel to aviation as fast as his quota allows.

Each month a class of 40 men begin

*Public Relations Officer, United States Marine Corps, Chicago, Ill.

Learning to type, and writing the final exam — Official Marine Corps Photograph



Post-graduate boot camp. Each man does an hour of combat conditioning each morning

clerical school and a similar number enroll in supply. At the other end of the 16 weeks' course 40 are being graduated from each of the two schools. In between are six other classes in various stages of their administrative education.

One of the most important courses is typing. The school takes men whose hands never gripped anything more mechanical than a plow and has them pounding out 40 to 50 words per minute upon graduation. Pay rolls, muster rolls, change sheets, naval courts and boards, official correspondence, accountability and subsistence are all included in the comprehensive score. Because of the fact that airplane parts must be drawn from naval aviation stocks, rather than from the Marine Corps, one of the most important courses is Aviation Supply Principles, a combination of navy supply and aviation accounting.

When the schools began in Toledo less than two years ago, 10 to 12 marines was the quota. At the end of this year Major Spalding estimates 5000 men. "But," the major points out, "the demand will be double that number."

Vocational Education in the City of New York in the Postwar Era

BENJAMIN J. STERN*

The first public vocational school in the city of New York was organized in 1909. Set up by Dr. Charles E. Pickett in a few rooms in an old elementary school building the Vocational School for Boys was an immediate success and before long occupied the entire structure. By 1920 the city was operating six of these industrial high schools. Like the first they were located in old school buildings or else in leased premises.

In 1920 the state of New York adopted a continuation school law under the provisions of which the city organized continuation schools to serve all sections of the community. Again old buildings were utilized and space found in other school structures wherever available. Despite handicaps these schools did a good job and grew in proportion. Due to various factors by 1938 the continuation schools emerged as full-fledged vocational high schools being reorganized by mandate from the state. One of the chief reasons for this change was the Great Depression of the 30's which sent many young wage earners back to full-time school.

In the space of 35 years then, the vocational education division of the New York school has grown from small beginnings into an organization consisting of 26 school units housed in 53 buildings with a staff of 2500 teachers and a pupil enrollment of over 51,000 young men and women. Of the buildings now in use, 11 were specifically designed as vocational high schools and built within recent years. Typical of these is the Machine and Metal Trades High School, The Brooklyn Automotive High School, Needle Trades High School, and The Jane Addams Vocational High School for Girls.

Eighteen months prior to the entrance of the United States into World War II, the vocational schools were already organized as afternoon centers for the training of mechanics for defense production. The active entry of our country into the conflict served to intensify this effort to the point where some of the schools were in operation 24 hours in the day. Adult education in the vocational and related technical trades has thus received a tremendous impetus which will undoubtedly carry over into the postwar period.

It is this period which is now occupying the thoughts of those in charge of the destinies of vocational education in New York City. A great deal of work has been done as well as considerable thinking on the subject with several considerations to guide these thoughts. First, in planning for the expansion of the vocational system it is necessary to take into consideration the care of those children who heretofore have been barred from taking vocational courses due to sheer lack of space. Second, consideration has to be given to the role to be played by the schools in the work of rehabilitation, retraining, and relearning that will undoubtedly be given to our returned veterans. Third, thought must be taken to the effect of the compulsory military training for our young people which no doubt will be a feature of our postwar world and which will probably mean the preparation of suitable pretraining courses for our schools.

The following program of postwar building has, therefore, been set. In many cases sites for these proposed schools have already been selected and the plans drawn up, ready to be taken off the shelf for bidding. This, of course, is in line with the wise policy of providing a backlog of public works to be ready for our veterans when the war is over, thereby helping to take up the postwar slack in jobs.

West Bronx Vocational High School — Bronx — General Vocational School for Boys — new

*Machine and Metal Trades High School, New York City.

Thomas Edison Vocational High School — Queens — General Vocational School for Boys — new

Wilbur Wright Vocational High School — Queens — Postgraduate for Boys — new

Bronx Vocational High School — Bronx — Addition to existing school — new

West Side Vocational High School — Manhattan — General Vocational School for Boys and Girls — new

Boro Park Vocational High School — Brooklyn — General Vocational School for Boys and Girls — new

Corona Vocational High School — Queens — General Vocational School for Boys and Girls — new

Morris Park Vocational High School — Bronx — General Vocational School for Boys and Girls — new

Wm. H. Grady Vocational High School — Brooklyn — General Vocational School for Boys — new

Greenpoint Bushwick Vocational High School — Brooklyn — General Vocational School for Boys and Girls — new

School of Industrial Arts — Manhattan — Replacement of existing buildings

New York School of Printing — Manhattan — Replacement of existing buildings

Brooklyn High School for Specialty Trades — Brooklyn — Replacement of existing buildings

Jamaica High School for Girls — Queens — Replacement of existing buildings

Aviation Trades High School — Manhattan — Replacement of existing buildings

Food Trades Vocational High School — Manhattan — Replacement of existing buildings

Building Trades High School — Manhattan — Replacement of existing buildings

Maritime Vocational High School — Manhattan — Change and replacement

The scope of planning is indicated by the foregoing list. Several interesting things may be mentioned about some of the schools listed. For instance, the Wilbur Wright Vocational High School will be located probably at one of our great city air fields and will be organized as a two-year postgraduate school for the boys graduating from Aviation Trades High School. The Food Trades High School is planned for location at a great terminal market to be built in lower Manhattan. The Industrial Arts High School probably will be located in a fashion center planned for the garment district of New York. The Maritime Trade High School is designed to be set on the waters' edge of lower Manhattan where practical training on shipboard can be easily obtained. All of these, of course, are still in the figuring stage but they certainly indicate the trend vocational education will take in the city of New York.

Another tendency that had to be considered in planning for the future is a nationwide drop in school registration. While this has been going on for quite a while, our vocational schools have begun to feel the effects only recently. This trend is certain to continue in the future and Mr. George F. Pigott, Jr., associate superintendent in charge of vocational education, in New York City, has wisely recognized and stressed this in his calculations. In order to avoid dangers of overbuilding it is proposed to build the schools listed in order of preference about as follows:

Replacements to come first for those schools which have demonstrated their usefulness and which are still housed in old buildings.

New buildings to be located in communities served by annexes of existing vocational schools which have shown their stability in, and usefulness to, the neighborhood.

Last to be built would be those new schools in communities which heretofore have not had adequate facilities for vocational training and which show a probable stable school population adequate for the new schools.

The vocational high school division of New York's educational system has grown to large proportions because of its success in training good citizens in every sense of that term. It is serving the nation through the war years by training mechanics for war production. It faces the postwar era with a cautious optimism and a determination to fulfill its destiny as well as human thinking can foresee it.

Don't Discard What You Have Struggled to Build

CLAUDE H. EWING*

The vocational schools of the nation have formulated a plan and, to a certain extent, established a program for the carrying on of vocational training which would meet the prewar needs of the nation. This program in many cities started with the rehabilitation of World War I soldiers and has been in progress for over 25 years.

We point proudly to the great number of contributions we have made to what are termed essential industries. We also know that we have made a contribution to what are temporarily termed nonessential industries. It is also evident that many of these so-called nonessential industries will take on great importance in the postwar era.

A great amount of time, energy, money for equipment, and school-building space has been expended in providing facilities and establishing these temporarily nonessential programs. Few of you who read this statement can look back upon your work of the past few years without recalling the extreme effort put forth to develop some phase of your vocational program.

We look at the dwindling ranks of our building trades apprentice department, the few students choosing commercial art, printing, and others that appear to be at this time of less importance. We also look at "Jack's beanstalk" — the few metal trades demanding expansion, equipment, space, and instructors all out of proportion to any school program's expansion in the past.

What are we doing about it? There is no question as to what the vocational schools are doing about supplying the needs of the war-production trainees. The records telling of the many trainees is sufficient evidence of the wholehearted support and success in this area.

The real question to be answered is "What are you doing to conserve your nonessential industries training programs?" Can we not take for an example industry itself? We are told that the next cars to come off the assembly line will be 1942 pattern. National trade organizations and national real estate organizations report that the widely advertised new home of the future may be a realization far in the future.

It might be well for vocational schoolmen to be "Scotch" at this time. Perhaps saving your old program patterns and the space, equipment, and necessary staff, as the auto people are saving their 1942 dies, will save your vocational school.

The burden of postwar taxes may not allow replacement of things discarded now. Wartime enthusiasm for vocational training is no guarantee of peacetime enthusiasm for vocational expenditures. To be concrete as to what we can and should conserve, the following is suggested:

1. Retain all staff members who have

*Supervisor of Curriculum, Washburne Trade School, Chicago, Ill.

been trained to fill some definite need in the school program. A building trades teacher can teach blueprint reading, mathematics, drafting, and many of the other phases of war-production training.

2. In making building changes for war-production training, change only the necessary things. Make an attempt to hold basic building needs for the peacetime training.

3. Give preinduction training, but give also some trade instruction. Youth entering service at 18 may not return until 22 or 24. Some training given now in peacetime work will give the returning youth something to turn to for employment.

4. Hold to all of your trade-committee contacts. If you have had meetings with various trade organization apprentice committees, do not be too busy at this time to continue. We may need all of these contacts in the postwar time.

5. Encourage your staff to do long-range planning. Those teachers with smaller groups to care for now have time to develop instruction material; to reorganize their school programs; and to be ready for the job that will have to be met just as soon as peace is declared.

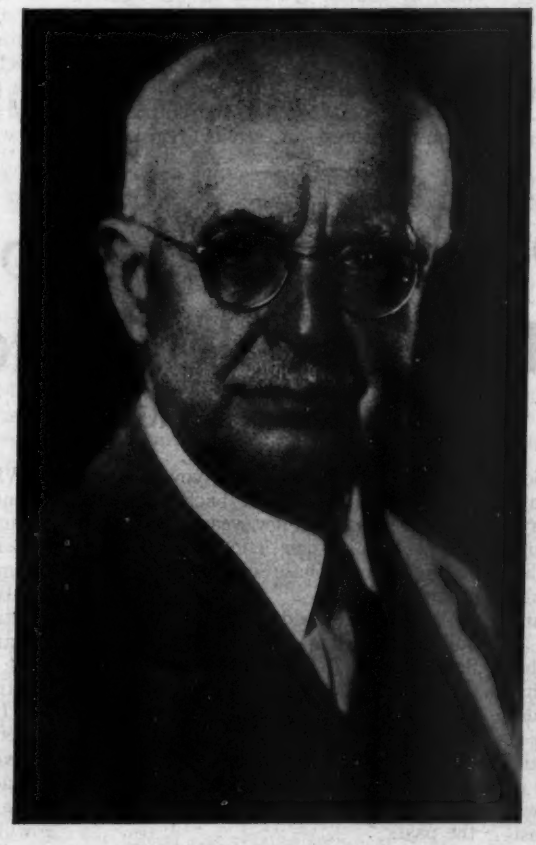
6. Keep in mind that the pendulum swings first one way and then swings back approximately as far in the other direction. This is not a time to crowd any other phase of education nor to demand more from the administrators of other educational activities than you are willing to give in the years to come.

Summarizing: we certainly have a job to be done now. We are doing it. However, we also face the problem of what our job will be in the next few years and we need all that we have built and gathered together to meet the demands of those coming years. We cannot afford to throw away things accomplished lest we find a need for them later and find them scarce.

Robert Lawrence Cooley—*Educator*

ROBERT W. TARBELL*

A great teacher passed this way. Where he walked, the way brightened; where he halted, men gathered to learn. Gifted with a rare discernment about the needs of people, his days were dedicated to the thesis that folks can rise above their surroundings. The contribution of this educator to his day and age will bear study for the benefit of generations unborn and inspire thousands to learn and prosper. Dr. Robert L. Cooley had a vision of a broader chance for those who work and set about to build for them. It may be too early to attempt an evaluation of the accomplishments of a man during his lifetime and yet we feel moved to pay tribute to folks while they are still among us. Future years will offer more abundant proof of the ability of this leader. Now, while the memory of daily contacts is still fresh and while his forcefulness and utter devotion to a great work still ring with vibrant tones, it seems fitting to pause for a moment and recount.



Dr. Robert Lawrence Cooley

Early Beginnings

Robert Lawrence Cooley was born in the village of Waubeka, in Ozaukee County, Wis., on May 3, 1869. His early years were that of a farm boy in uneventful surroundings. It seems that plowing a field may produce a philosopher, for the future schoolmaster reasoned that he must some day break away and prepare for his lifework. Something about the simplicity and rigor of the farm stayed by. Was it while hauling loads of gravel that he determined to go on to school? Was it out there in the little community of neighbors that the practical problems of each day set a pattern for his later activities? Practical men work directly toward the goal, caring little about who thought of the idea first but more about getting the job done. Those who worked with this man have often heard him say that he still carried with him the habits of the farm.

But the school house beckoned. The youthful Robert Cooley became a teacher in a country school. At a later date he attended the Oshkosh Normal, graduating in due time. Between farm and factory and school the foundation for future growth was balanced and sound. From assistant principal in the Oconto, Wis., high school he was advanced to the principalship and to the superintendency, serving in that capacity for eight years. In 1903 he came to Milwaukee to become the principal of a grade school. Nine years later, in 1912, his great work began as founder and director of the Milwaukee Vocational School.

Intimate Observations

Writing ancient history calls for a search into old documents, customs, tombs, and inscriptions. It is purely objective, with scarcely any of the fervor of personal interest to illumine it. But telling about a contemporary offers the chance to relate firsthand impressions. The subjective point of view may creep in to enliven the personal touch. The author can be forgiven, therefore, if he indulges a bit, because admiration for a great leader will burst out spontaneously.

It was in the early days of the Milwaukee Vocational School. At a conference in Milwaukee in November, 1912, the late Dr. Harvey, president of Stout Institute, was speaking. Mr. H. E. Miles, then president of the State Board of Industrial Education, was in attendance. Dr. Cooley was present. There were others in the audience, possibly fifty people. The discussion centered around ways and means to operate this new type of school. Dr. Cooley finally commented, "Next week we expect to

*First Vice-Principal, Milwaukee School of Vocational and Adult Education, Milwaukee, Wis.

enroll several classes of girls from the department stores. Our hope is to make them better clerks and better people because of their day in school." That is the core of his philosophy. A day in school makes a difference. Personal observation of students at work gave him a keen insight into the daily lives and problems of boys and girls. He frequently related anecdotes about conversations with students who were unaware of his position in the community. It is to be presumed that he gathered interesting reactions from these contacts.

The man who undertakes to steer a vessel through uncharted seas must keep a weather eye out for the unexpected. It would be easy to land on the rocks, lose the course or to find himself becalmed. Foresight and a knowledge of things beyond the horizon are indispensable. All these point to the necessity of careful planning. One who was privileged to see these embryonic events is constrained to stand silently before the accomplishments, finding difficulty in describing them.

His Real Job

And now we attempt to speak of his chief work, the building of a great, new school. It is no small matter to step out of the ranks as an elementary principal and blaze the way for a new institution. And when the new venture is fraught with uncertainties, the problems multiply. From his own words and the comments of others we can gather the story.

The system of vocational schools in Wisconsin started with a state law. It was a good law, written in the interest of men and women, boys and girls who had left school to go to work. A program of continued education was to be set up for this large group of people. Statesmen in and out of the legislature saw this group facing the problems of life in a great commonwealth, meagerly prepared to earn a living or to exercise the responsibilities of citizenship. Be it said, therefore, that the Wisconsin law was a good foundation. It has been improved over the years. But new laws need to be studied and interpreted. Weaknesses may come to the surface, opposition may arise, various meanings may be read in and delays may occur. The picture that was so clear to those who wrote the law may be confusing to the rank and file. How will the public respond? Is the whole plan workable? Dr. Cooley discovered these problems and many more before the first classes were convened. The way he went about the matter is now understood in the light of accomplishment over the past thirty years. Some changes in human affairs are brought about by passing a law or setting up a regulation. Others come by preachment. Here there was no choice. The law was on the books. It was mandatory. It was the duty of the new director to administer the will of the people and build a new school to fit the needs. His immediate customers were employers and students.

Dr. Cooley was courageous. He looked ahead and sensed that his job was not to set up a traditional institution. A new law would not be necessary for that. Here was to be another chance for an education, laid at the door of people who need it, and the pattern was to be cut to fit. Perhaps out of this situation sprang one of the favorite epigrams of this man, "The needs of the students shall determine the curriculum." Down through the years that thought has challenged his associates and resulted in many developments for the upgrading of people. While that statement may appear very simple and quite to the point, it does have ramifications. Many years later Dr. Cooley repeated the thought and remarked that by this very simple formula we had grown into a complex institution. Providing special training for thousands of people does bring on complexities.

Flexible curriculums call for flexible teachers. That hardly tells the whole story, but an initial job was to go on a hunt for a faculty. It is not necessary here to enlarge on the matter of teacher qualifications, but merely to state that the director set about to gather strong people to work with him. One mark of good leadership in any organization is the ability to select and hold capable workmen.

Not a small item was the equipment. The traditional pattern was manual training. The easy way would have been to set up some standard shops with accepted practices. But the vision ahead of this leader was a school where people could prepare for the job outside, could receive extension training on the job they held and where a fuller grasp of opportunity could be theirs. It would be easy to skid into the ditch in the matter of equipment. Questions of budget, policy, usefulness, timeliness, adequacy — all these and others were met and solved by this schoolmaster who was determined to administer the full intent of the law.

Catching the Vision

Dr. Cooley frequently remarked that a quarter of a century was quite a stretch in the life of an individual but a very short time in the life of an institution. Imagine the vision, then, of this courageous schoolmaster who began definitely to plan for a building and a home for this school before the end of five years. The needs of a growing institution were taking shape. The rented quarters were too small. A new formative period was starting. Mr. Director, what kind of a building is needed? Sit down with the architect and plan the structure. We may pass over at this time the matter of financing, location, public approval and a host of external things that might have confounded most men. A building was to be built, suited to the needs of generations to come. Hind sight may be meritorious, but foresight is rare. The writer, one day, visited the ground selected for the new structure. An old brick building stood upon the spot, forsaken and in ruins. Several other people were there. Dr. Cooley scanned the premises and said, "A building will rise here. We will have shops and classrooms, offices and assembly halls." Then in his own direct way he pictured what he saw in the future. It was floor above floor, full of opportunity for all who would enter its doors. Guidance as a national movement was not yet strong in its own right. But the thought of this schoolmaster that day was a place in the new building where the principal vocations of the community would be set up in miniature. A young student would receive his guidance by the practical plan of tryout. Thus he dreamed and built. His answers were ready before the problems appeared over the horizon.

His Formula

We are all prone to look back over the road and reminisce. So of this man, now retired from his work, we can speak with affection and be forgiven for a few personalities. His simple formula for building the institution has been mentioned, that of fashioning a curriculum to suit the needs of students. The implications in that one idea are many. It means constant revision of programs. It means keeping an ear to the ground to detect the rumblings of a new day. That which had served its time was discarded. New plans developed as the world of work made progress, all with the idea that the school must keep up to date.

But in this reminiscent mood it is hardly safe to trust one's memory. We quote from others of a bygone day, those who knew him back there in the years of strength and accomplishment. It was James O'Donnell Bennet, writing in the *Chicago Tribune*, who said, "The acres of classrooms, laboratories, libraries, offices, workshops, restaurants, gymnasiums, swimming pools, and theater of the Milwaukee Vocational School — are, I suppose, the premier civic glory of Milwaukee." And then it was the great George Kirschensteiner of Munich, father of the continuation school movement in Europe, who rose to his feet in Edinburgh at the World Federation Associations and said, "But my friends, if you wish to see the outstanding vocational school of the world, you must go to Milwaukee in North America." Another commented that Dr. Cooley, stressing the value of a good library and read-

ing habits, said, "Your language, your everyday talk, is part of your appearance. Look after it. If your language is not neat and fitting, why not wear dirty clothes, too?" And so the parade of admirers might go on, each glad to speak a word of praise.

The Philosopher

Every man finally becomes a philosopher. It may be only in reverie for some; for others it becomes a formal expression. Dr. Cooley will be remembered for his novel, direct and pithy statements that shot to the heart of a question. Among his associates these very significant and pointed statements were known as epigrams. They have been called Cooleygrams. In some of these terse, homely sayings we catch a vision of the man and an insight into his point of view as an educator. Once in a little group meeting somebody lamented the fact that young students were a bit irresponsible and noisy. Said Dr. Cooley, "You cannot have horses without raising colts." On another occasion a suggestion was made to put a little effort into some phase of training where development was still necessary. Quite evidently the proposed effort was too trivial to assure success, and another epigram came forth, "I would not use a single stove to warm a prairie." Again you see this man suggesting in an artful way to some young men that, after all, their language may have something to do with their success in shop and factory and store, as he quietly reminds them, "We wear our language like a garment." One time some men were discussing the usefulness of broader education for people who enter the industries. We are all familiar with the argument that practical men work with their hands and don't need extended training. The following answer harks back to the farm for a setting but fits this question admirably. "An untrained man is like a farmer going to market with an empty wagon box." Dr. Cooley frequently said that any illustration would break down if carried far enough. This next one still holds up, however, even with a vein of humor. "A boy is a good deal like a clock. You can take a clock, sometimes, and shake it and make it run, but you have not fixed it." A good answer was forthcoming on an occasion when the matter of training for all, versus concentrated effort on a few leaders was up for consideration before a conference. "I'd rather raise the general level an eighth of an inch than build up a few mole hills." Again, in sympathy for students where they are and in recognition of their present status as a point of departure, we frequently heard this admonition, "We have no quarrel with a student's antecedents; we will start where he left off." In discussing the value of explicit instruction to a student, especially where that student is on a part-time program and needs to conserve his time, he might tersely say, "Always put the drop of oil where the squeak is." Almost like the voice of an oracle comes this reminder to the faculty, "Count that day lost in which a teacher fails to change a student's thinking." And with a touch of humor this one was added, "Some guidance is like shaving before the whiskers come."

Verily, the words of a man bespeak his inner self. Some are great preachers. Others are rich in banalities or withering in contempt. Those of us who worked with Dr. Cooley over the years will cherish these epigrammatic statements on the tomorrows yet to come.

National Activities

Dr. Cooley was not confined to Milwaukee alone. While his chief job was to build the Milwaukee Vocational School, still the world made inroads on his time and energy. Emerson is credited with saying, "If a man write a better book or build a better house or make a better mousetrap than his neighbor, though he build his hut in the wilderness, the world will make a beaten path to his door." In the language of the street men elsewhere began to say, "I think he's got something there." And so it was early in the history of the institution that such men as David Snedden and Charles Prosser began coming to Milwaukee to study this school, only a stripling but husky and growing. We recall, too, that day in 1918 when we bid him good-by for a time. He was away on a mission at the request of Colonel Goethals who had asked him to take over the educational work in the Joseph E. Johnson quartermaster's training camp, in Florida. Later he was called to Washington to undertake an educational program in connection with the Motor Transport Division. Some years later Dr. Cooley was on the staff of Columbia University for three summers, conducting courses in the field of part-time education. In 1927 he was elected president of the Wisconsin Teachers Association and later in the same year he was elected to the presidency of the American Vocational Association, which latter position he held for two years. In 1929 Ray Lyman Wilbur, then Secretary of the Interior, asked him to become a member of the National Advisory Committee on Education. He accepted. Later he served on the advisory committee of the survey of secondary education. He is a life member of the American Vocational Association and of the National Education Association. Along the way the University of Wisconsin conferred the degree of master of arts upon him, and Stout Institute conferred upon him the degree of doctor of science. Many other instances of recognition came his way.

An Appraisal

Perhaps no one can fully appraise a contemporary. And yet the picture can be painted in outline. The details can be worked in later as the years throw greater light on the prospect. Let us recognize that we are reviewing the accomplishments of less than thirty years, a period of cut-and-try, dynamic progress and courageous leadership. What manner of man is it who can start with an unpopular law, a desk and a chair and build a great institution in so short a span? What magic did this man possess that he could captivate the minds of others and bid them follow in this enterprise? The ability to visualize was a part of the secret, and yet he was more than a visionary. Not a small part of the job was the matter of selling the idea to a public that knew little about the objectives of the law or the possibilities ahead of the institution. Dr. Cooley once remarked that any new movement in the field of education usually worked its way into the school system from the basement up. He pointed out that manual training and home economics were allowed space, a bit grudgingly, in leftover quarters in basement rooms. If they could survive, they might at last be granted space up in the sunlight. Then he commented that this new vocational school movement would be on trial for a time before being fully accepted. It is not to suggest that no mistakes were made. This man of whom we speak once said that he found employers in industry with a scrap heap on the premises. Every organization does some experimenting. And he said, "I am not ashamed of a scrap heap here. If we find that a plan of procedure is faulty, we will have the courage to admit our mistakes, abandon that plan and try a better."

And so, after the years since 1912, there is now a monument to his efforts, an institution that is flexible and responsive to the needs of the community, a school where upwards of forty thousand students are in attendance during the year. The building, equipment, and staff are at the service of the public. If we appraise the results by the size of buildings, by attendance, by contacts, we are moved to call it great and to give due credit to the founder. The writer stood with him one evening on the sidewalk outside the building. We had recently moved in. Said he, "Some time this building will be a blaze of light, with thousands in attendance at evening classes." Perhaps we should call an institution worthy that achieves its goal, in this case fulfills the intent of the law. Or shall we measure success by the heartbeats of humanity, the upbuilding of many thousands who have entered its portals to learn?

In the evening of his life we look out across the stretches of tomorrow and catch a glimpse of the vision that has been his throughout a busy career. Generations unborn will be happier and more prosperous because of the opportunities he has brought. The receding sun permeates all with the glow of eventide. And that shadow stretching away from the walls of the school he built seems not to take shape from the brick and mortar. It is not ominous but full of promise, the lengthening shadow of a great man.

Commencement Exercises

MILTON LUNDEEN*

The following description of a commencement exercise held in the Joliet Public Junior High Schools demonstrates one method used to acquaint the public with the type of training given to the pupils in the community. Approximately fifty boys from the seventh and eighth grades participated in the program.

Two boys were selected to take the part of a father and son in the living room of a typical home. The conversation was used as a prologue to a class demonstration. The father, just coming home from a trip, questions his son concerning his schoolwork for the coming year. A number of questions were asked by the Dad and answered by the son. (Similar to "Industrial Arts on the Air," April, 1934, INDUSTRIAL ARTS AND VOCATIONAL EDUCATION.) The son then invites his father to visit his classes the next day.

Following the short dialogue, the stage was set for classes representing the four areas of training in the industrial-arts program, namely, printing, mechanical drawing, wood and metal shop, and elementary electricity. Between each of the three units, instrumental numbers were given by boys from the music classes. These selections were played in front of the curtain while stagehands, composed of boys taken from shop classes, set the scenery. The equipment and material used was gathered from the shops in each of the junior high schools. The oral description of the work was given over the loud-speaker system and demonstrated by the pupils on the stage as described in the following article and illustrations.

Introduction

We should like to introduce to you three short activity groups relative to the work of the industrial-arts department of the Joliet Junior High Schools. The program has been divided into three sections. The first is "Dad Finds Out," dramatized by two boys from grade 8B. This will be followed by two classes representing the four areas of our industrial-arts program, namely: printing, mechanical drawing, woodshop and elementary electricity.

Printing

Since man became a part of this earth he has endeavored to establish a record of his achievements. Time does not permit a complete story of our graphic history; however, let us mention a few of the most important steps in the early development of communication which lead us to our modern day printing.

Raising heaps of stones was one of the earliest methods of recording an important event. The death of some important person in a tribe or the celebration of a victory was also commemorated in this fashion. We still use this method of preserving history by erecting monuments for many important occasions and personages. Clay tablets, inscriptions, and pictures were made or inscribed on the walls of caves. Writing on goatskins is also representative of early steps in the development of printing. A very important contribution was made to the graphic arts, as well as to the cause of civilization, when the Phoenicians introduced phonetic characters for conveying information. Early parchments, manuscripts, and books are outgrowths of this type of expression.

The year that has just come to a close marks the beginning of the sixth century of modern printing. Most outstanding of all the 1940 anniversaries in the printing business, however, was the five-hundredth birthday of the invention of printing from movable type by Johann Gutenberg. From the time he was 13 years old Johann began to perfect the process of printing until in 1440 he printed his first book from movable type. From that time the printing industry has progressed so rapidly that it now is ranked in sixth place in the United States with respect to the value of its product.

The boys in this classroom are taking courses in the graphic arts which include printing and mechanical drawing. On the left side of the stage they are performing various tasks and gaining experiences which will acquaint them with the tools of the printing industry.

The chart that John is pointing to represents some of the experiences that each boy receives. They are: type arrangement, type setting, spacing, and shop mathematics. From these fundamentals the boys set up and print jobs, tickets, report cards, and other school records. Through these experiences the boys learn the principles of punctuation, capitalization, word division, and sentence structure. While some of the boys in this class are setting a job, others are distributing their finished work in the case. Charles, the boy at the proof press, has just finished his [illegible]gned job and is ready to pull a proof. John is cutting out a design on a linoleum block which will eventually be a design for a book cover similar to the book illustrated.

Many exercises included in each course are typical of the trade operations, and are arranged from simple tasks to more difficult problems. As these boys show proficiency in the various fundamentals, they are given some practical experience in setting up tickets, programs, P.T.A. announcements, and other special forms.

Practically all records and printed forms used in our schools have been printed in the school shop. The ticket of admission which you used this evening, your boy's report card, permanent records of all kinds, are samples of the work done by these boys.

Mechanical Drawing

Mechanical drawing, the industrial language of all nations, as illustrated on the other half of the room is another form of graphic arts taught in our schools. Probably no other subject, with the exception of the English language, plays a larger part in the daily life of modern man than drawing. Although many people are unable to read simple blueprints, yet practically every manufactured article which they possess was made according to some sketch or blueprint which someone had to be able to make and read. Hardly a day passes that one does not come in contact with some form of drawing ranging from fine artistry to highly complicated plans. The automobile, the golf clubs, the chair in your kitchen, even the clothes you wear are first recorded in the form of a sketch or drawing.

With this background of possibilities of mechanical drawing in our junior high school curriculum, let us proceed to the steps involved in producing a complete drawing plate.

1. John will show the top, front, and end of the model piece from which we are developing a drawing (any suitable model and drawing). He will show also an oblique view of the piece. (John presents Chart I.) The following drawings are arranged for sequence in operations.

Orthographic projection is the accepted name by which we identify the type of working drawing about to be made.

*Industrial Arts Supervisor, Joliet, Ill.

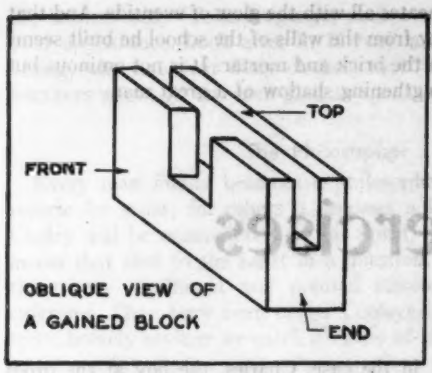


Chart I

The student makes his drawing from a pictorial drawing such as the oblique projection shown in Chart I.

2. (Roy presents Chart II.) Roy has the border and identification on his drawing. He also has added the plane lines.

The border and identification of a plate are important features of a complete drawing and considerable care is exercised in placing the border and the lettering on a drawing.

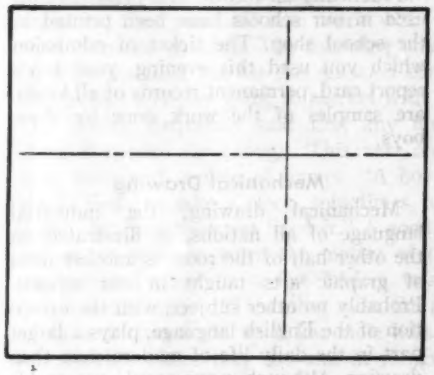


Chart II

The plane lines such as these dash-dot lines are often used to help in producing a drawing which is properly balanced on the plate. They insure a proper space for each view. Plane lines aid also in projecting from the different views.

3. (Charles presents Chart III.) Charles has the top view in its place. The view which shows the greater amount of detail of the object is chosen as the first view to be drawn because it aids in projecting lines to the remaining views. In this case the top view has been selected.

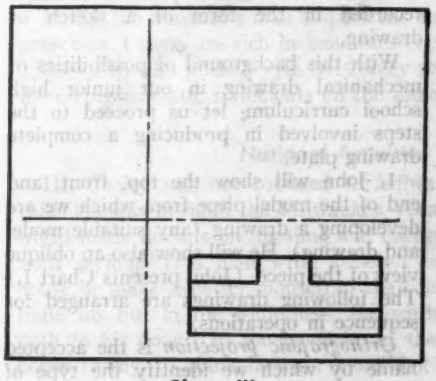


Chart III

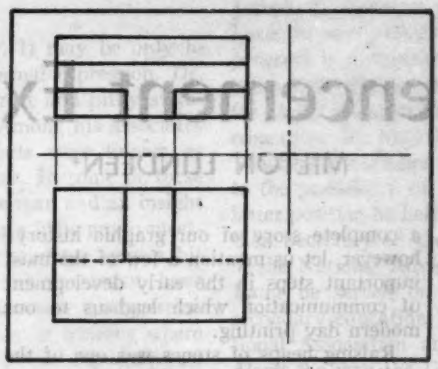


Chart IV

4. (Richard presents Chart IV.) Richard has the top and front views in their proper location. The vertical lines of the front view are projected from the top view. The horizontal lines of this view are stepped off with the scale and the dotted lines shown in this view are used to indicate the position of hidden parts of the object.

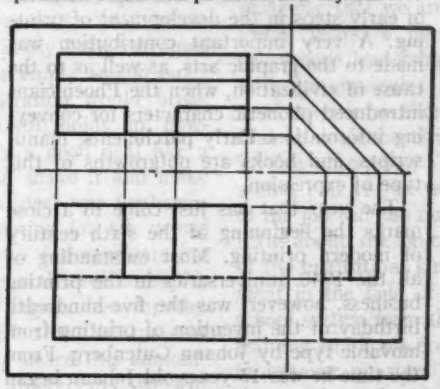


Chart V

5. (Russell presents Chart V.) Russell is showing the top, front, and end views in their proper places. The end view is formed by lines projected from the top and front views.

6. (Jack presents Chart VI.) Jack erased the purely constructional lines and has added the dimensions, arrows, and auxiliary lines. The title also has been put in its proper place.

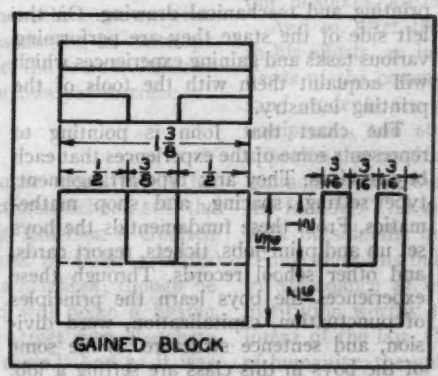


Chart VI

Dimensions, arrow lines, and auxiliary lines are placed where they will most readily indicate the various measurements. The title should be placed in a convenient position for the identification of the object that has been projected.

Drafting in the junior high schools has many values for the boy who learns the principles which are involved in drawing the views or planes as shown in these charts, or those involved in making a piece of furniture in the woodworking class, or for one who may be laying out a plan for a wiring circuit.

Drafting may be looked upon as related work and has exploratory value as well. The work done in the drafting room may disclose aptitudes and capacities as much as any other work done by the pupil in any other class. Like other shopwork, drafting helps the boy to find himself vocationally and serves as a basis for guidance by the teacher. These boys are now actively engaged in making drawings. The tools of learning include such drawing instruments as the T square, triangle, scale, compass, and drawing board. Much of the work is carried on by individual instruction and by the use of reference books. Class demonstrations are given by the teacher, and slides or charts similar to those you have seen this evening also are used. Through the use of these tools and methods the boys are performing such tasks as will enable them to plan the problem and perform the experiments that you will see in the next scene which represents a class in woodwork and electricity.

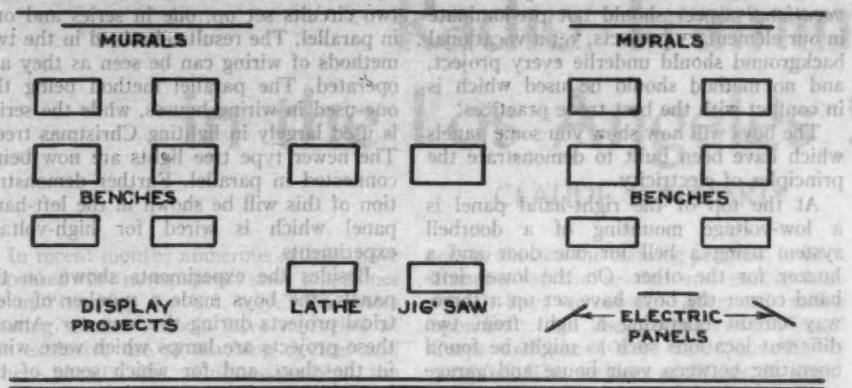
Wood and Metal Shop

If you were fortunate enough to be enrolled in a woodshop about twenty years ago the extent of your training was the making of wood joints, planing a straight edge on a block of wood, and probably a few other cut-and-dried tool processes. Today, your boy is encouraged to apply his interests in as many different manners as his abilities and talents permit. His interests are motivated by exploring in a wide variety of materials which are in some way related to the field of industry.

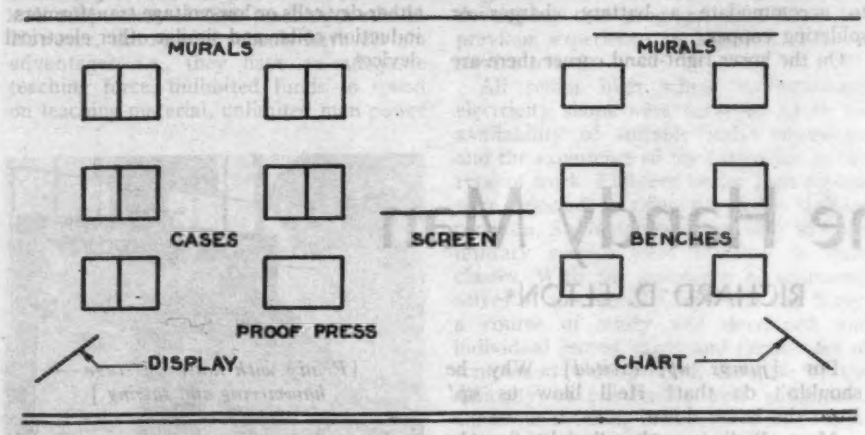
The general objectives, as we apply them to our local situation, are shown on the chart and are being pointed out to you by Charles Jones. They are:

1. To acquire reasonable skills in the use of common tools.
2. To understand the relationship of wood to industry.
3. To understand the basic principles of wood finishing.

These objectives are used as a basis for selecting the activities performed by the boys. If the community is industrial, commercial, or a combination of the two, the industrial-arts work in school should be influenced by these facts. The question is sometimes asked, "Why do we start with woodworking in the industrial-arts



Stage setting for woodwork and electrical shop



Stage setting for printing and drawing

courses?" One plausible reason is that hardly any other craft uses so many distinct tools as does the woodworking industry. This becomes obvious when we consider woodworking as a whole. Almost everything we use is either made of wood or its original pattern was made from wood.

Because metal products have become increasingly important in the consumer's market, the typical woodshop has been reorganized to include metal and plastic materials.

Some of these problems are now being made in the classroom before you. Charles is working on a breadboard, learning the six steps necessary in squaring a group of adjacent rectangular surfaces. If he has mastered this job, he has learned the fundamental processes necessary for fitting drawers, table tops, and other objects rectangular in shape, be it of wood or of metal. James is bending and forming metal strips which make up a part of a towel rack. The boy at the jig saw is cutting out the design pattern for the side of a wall rack. The completed problem will look like the rack held up by Joe. During the process of construction he will have used a jig saw, try square, ruler, plane, marking gauge, file, hammer, nail set, and other finishing materials. The end table which you see is being made by John Jones who is in the eighth grade. Practically all tool processes available in the school shop have been used in the making of this table. Besides the common hand tools, he will have used the band saw, the jointer, and the lathe. One leg of the end table is now being turned on the lathe. After the project has been assembled he prepares and applies the finish. This table together with the projector which you see on display before you are typical examples of the work done in the woodshop. The construction and finish of each problem is accomplished by teacher demonstration, drawings made by the pupils, as shown in the mechanical drawing class, and textbooks supplied to each pupil.

It is well to note also that a study of wood, its by-products, metal, plastics, and their relation to industry receives a portion of the time given over to this unit of work. To buy efficiently, it is necessary that a person recognizes the difference between good and poor merchandise. There has probably been no greater need for intelligent consumer education than that which our present-day conditions demand.

Moreover, the training, meager as it may be, will find practical application in the performance of unspecialized activities about the home or in the garage. The boy at home may repair the legs on a chair, as this boy is doing, or he may help glaze a window, repair the front steps and many other tasks about the house which would make the home more livable.

Electricity

The introduction of electrical work in the junior high schools has been quite recent. Because of the rapid growth of the uses of electricity in domestic and industrial life and because it is affecting people in all walks of life, it has become necessary for the schools to give a portion of the student's time to this type of activity. Regardless of his future vocation the student will be at a distinct disadvantage if he is deprived of an opportunity to study electricity.

The nature of the work offered is quite general in character and is, therefore, largely *exploratory*. The great value of any industrial-arts work is not in the project itself, but in the information, knowledge,

Stage setting for woodwork and electricity

and training gained while performing the task. From this general principle the aims of the elementary electrical course in the junior high school may be stated thus:

1. To give general knowledge pertaining to the principles of electricity.
2. To encourage exploration in the electrical field by experimenting with electrical equipment, such as bells, buzzers, batteries, electric irons, and the like.
3. To learn to make simple electrical repairs.
4. To become consumer literate in the electrical field.
5. To furnish educational and vocational guidance.

Because the aims are so largely exploratory and guiding in nature, the junior high school teacher must not permit the pupil to do things which he or she will have to unlearn upon entering industry. While the *vocational* aspect should not predominate in our elementary projects, yet a vocational background should underlie every project, and no method should be used which is in conflict with the best trade practices.

The boys will now show you some panels which have been built to demonstrate the principles of electricity.

At the top of the right-hand panel is a low-voltage mounting of a doorbell system using a bell for one door and a buzzer for the other. On the lower left-hand corner the boys have set up a three-way circuit operating a light from two different locations such as might be found operating between your house and garage or upstairs and downstairs. It is also wired so that they have a hot outlet at all times to accommodate a battery charger or soldering copper.

On the lower right-hand corner there are two circuits set up, one in series and one in parallel. The results obtained in the two methods of wiring can be seen as they are operated. The parallel method being the one used in wiring houses, while the series is used largely in lighting Christmas trees. The newer type tree lights are now being connected in parallel. Further demonstration of this will be shown in the left-hand panel which is wired for high-voltage experiments.

Besides the experiments shown on the panels, the boys made a number of electrical projects during the semester. Among these projects are lamps which were wired in the shop, and for which some of the boys taking elective art made their own shades; small motors which operate on either dry cells or low-voltage transformers; induction coils; and similar other electrical devices.

The Handy Man

RICHARD D. ELTON*

A One-Act Play for an Industrial-Arts Assembly

SCENE: An average home. Pop reading paper; Mom sewing; Son working at a desk.

CHARACTERS: Father, mother, daughter, and son.

SON [*looking up*]: Hey, Pop, will you help me with this math?

POP: Can't, son, it wouldn't be right.

SON: Maybe not, but you can try. [*Pause.*] Gee, I don't like this stuff but I guess its necessary for a lot of things. [*Gets up from table.*] Say, Pop, how about letting me go to the basketball game and finish this when I come home?

POP [*pays no attention to son*]: Oh, Eleanor, have you seen the other section of the paper?

SON [*trying to get attention*]: How about it, Pop?

MOM: I think it's in the kitchen.

SON: Let me get it for you — sit right still. [*Exit right quickly.*]

MOM: He is willing to help —

POP [*finishing sentence*]: Yes, when there's to be a reciprocal trade agreement, or what he hopes will be one. By the way, how do you suppose he's getting along in that new "lumber work" course at school?

MOM: All right, I suppose.

POP: He seems to be trying harder with math — says that he needs it for this course.

SON [*calls in from off right*]: Where'd you say the paper was?

MOM: On the table. [*To Pop.*] The other day he fixed the cord and plug on the flatiron.

POP [*jumps up, excited*]: Why he shouldn't do that! He'll blow us up! Burn the house down!

MOM: Well, it works all right. Says he learned how in the industrial-arts shop.

SON [*carrying paper with potato peelings on it*]: Lulu was peeling potatoes on it. [*Empties peelings in basket.*]

POP: Thanks!

MOM: Oh dear.

SON: While I'm up shall I go to the game now?

[*Ready with noise off stage.*]

POP: Ought to tell Lulu to look at the dates on the paper before she uses them.

SON: The first game starts at 7:30.

MOM: I'll speak to her in the morning.

SON: It ought to be a good game. [*Suddenly thinks.*] Can I get you your slippers?

[*Crash, bang off stage left.*]

MOM: Good heavens!

POP: What was that. See what it was!

DAUGHTER [*entering from off left*]: Ow-w-w-w-w-w-w.

MOM [*rushing to her*]: Oh, what's the matter?

SON: More delay!

POP: What happened?

DAUGHTER: I was just exercising on the bed — exercises to keep — and, well, it went down. The sides split, and the braces came off, and —

MOM: Are you hurt?

POP [*trying to quiet things*]: Well, you can sleep on the sofa tonight. We'll get the carpenter in the morning.

SON [*to audience*]: Here's my chance. [*To Pop.*] Don't bother with a carpenter — [*Roll of drum.*] I'll fix it.

[*Ready with noise off stage — hammering and sawing.*]

DAUGHTER: Since when are you the handy man —

SON: Oh, you're just jealous because you can't take industrial arts.

[*Exit left.*]

[*Sawing and hammering starts.*]

DAUGHTER: The perfect husband!

POP: Do you think we ought to let him tackle the job?

MOM: It's an old bed, let him try.

DAUGHTER: May be old — but it's the only one I've got. I'm going to go watch.

[*Exit left.*]

POP: My, he *does* learn a variety of work in that shop course. Certainly more useful than he used to be.

MOM: Yes, and he seems to enjoy it. He always wanted to make things and now he knows how. By the way, didn't he want to go to some game tonight?

[*Hammering, sawing, etc., has been going on during these last six speeches. Then son enters, followed by daughter.*]

DAUGHTER: Golly, he really *did* fix it — and it's stronger than before — and I can —

SON [*cutting in*]: Nothin' to it. Just lined up what had to be done, and grabbed a couple of tools. Made a new bracket — a couple of new braces — with a hole through 'em — then I fashioned another —

DAUGHTER: Excuse me, master mind — mother, I'm going to the game now.

POP: Why don't you go along with her, son.

[*Curtain*]

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Radio Training in the Los Angeles Schools

CLAUDE E. NIHART*

In recent months numerous articles have appeared in newspapers and magazines about "teaching the G.I. way." Educators visiting service schools have marveled at the extensive use of teaching devices and other visual aids. Unquestionably, the Army and Navy have done an excellent training job, and the public schools could well adopt some of their teaching methods. However, the service schools have certain advantages, i.e., they have an adequate teaching force, unlimited funds to spend on teaching material, unlimited man power

Radio testing equipment made from salvaged parts

to develop teaching aids and devices; students are carefully selected; discipline is not a problem; attendance is mandatory, and if the student doesn't come up to certain standards, he is washed out. But probably the greatest advantage is that the objectives of the training program are clearly defined. There is motivation. Teachers and trainees know exactly why they are training and what they are training for.

The Los Angeles schools have had an excellent example of the effectiveness of training for specific goals in the tangible results of the senior high school radio training program. In September, 1942, before preinduction training courses were organized, the local offices of the U. S. Navy and the U. S. Signal Corps contacted the vocational and practical arts office and proposed that the Los Angeles senior high schools introduce fundamental courses in radio maintenance and repair. The purpose was to shorten the training program in both branches of the service and enable high school boys to obtain advanced rating upon induction. The proposals of the Signal Corps and the Navy were immediately accepted. The services of Water B. Ford, instructor of electricity at Eagle Rock High School, were secured to assist in developing this program. Mr. Ford had previous experience in teaching radio in service schools.

All senior high school industrial-arts electricity shops were surveyed as to the availability of suitable radio equipment and the experience of the instructor in this type of work. Eighteen senior high schools were selected to offer the radio training program. Students who were soon to enter military service were enrolled in these classes. With the assistance of representatives of the Signal Corps and the Navy, a course of study was developed and individual record cards and certificates of completion were printed. Because of the difficulty of purchasing new equipment, numerous teaching devices were made from salvaged material. The radio training program has been in operation three semesters and is still going strong. Since both students and teachers know the exact purpose of the program, there is no problem of motivation. Recently there appeared in a local newspaper the following item:

"A tribute was paid to the high-caliber curriculums of the Los Angeles city schools in figures released by the Navy Recruiting Service, showing percentages of applicants who have taken and passed the Eddy radio technician test. In the Los Angeles area, 49.5 per cent of the applicants who take the examination pass it. In other sections of the country, percentages of passing grades run lower. . . ."

Radio training class in a Los Angeles senior high school

"The Eddy test is given to all 17-year-old applicants who show aptitude for further training to become radio technicians. The examination reveals basic knowledge of shop practice, radio, electricity, and mathematics. Navy applicants who receive a passing grade are enlisted with the rating of Seaman First Class (Radio Technician) and are earmarked for intensive schooling in highly specialized fields of radio and electronics."

The Los Angeles schools are proud of this record, but any other school system starting early on a training program, with comparable facilities, probably would have done as well. The important factors in the success of the radio training program are sound instruction, carefully selected students, clearly defined aims, and definite motivation. Under such conditions, the success of any training program is practically assured.

THOSE AT HOME MUST ALSO SERVE

The attack on Pearl Harbor has abruptly transformed the slogan, "Safety for Defense" from a theory to a fact of deep and vital significance.

Indifference to safety at the present time means indiffcrence to National Defense, and indifference to national defense means disaster.

Accidents resulting from motor-vehicle collisions cut deep into defense activities the same as accidents in industry, hence safety on our streets and highways is needed more today than ever before. A dead man or an injured person lying in a hospital from a motor-vehicle collision cannot help supply the arms, the mechanized units, the bombing planes, and the many other needs of the armed forces fighting the Axis. Moreover, the injured divert the attention and potential efforts of those who must serve them.

"What can I do to help?" is the nationwide cry in the present crisis. Motorists can do plenty! They can control their emotions and remain calm while driving; they can cut excessive speeds and operate their vehicles as economically as possible; and they can drive cautiously, skillfully, and make a conscientious effort to avoid accidents.

— *Milwaukee Safetygram*

Nice table manners can be a deciding factor in a boy's employability. — R. L. *Cooley.*

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The Problem of Teaching Blueprint Reading

GEO. A. WILLOUGHBY*

The necessity for training thousands of men and women for war-production occupations where blueprints are used has brought the teaching of blueprint reading in a practical manner to the forefront. Many instructors are considering the problem at the present time, and although there are differences of opinion as to the best method, the writer herewith presents some facts and personal opinions which may be of assistance.

First, many people have learned to read blueprints who have never learned to draw. This is evident if we consider the hundreds of workmen who carried on for years working from blueprints that were drawn by engineers and draftsmen.

It is no more an absolute necessity for a person to make working drawings before he can learn to read them than it is necessary for one to write an article or a book before he can read and understand printed material. There are many more readers of articles and books than writers, and likewise there will always be many more blueprint readers than engineers and draftsmen.

However, it is certainly true that it is of considerable value to a workman to be able to draw as it is for a reader to be able to write. A workman who can make technical sketches to express his ideas finds it of great value, and persons who have had extensive courses in drawing usually have less difficulty in reading blueprints than do those who have not taken such courses.

Nevertheless, if time available for training is limited, or if elaborate equipment is not available, and if the aim is to give a working knowledge of blueprint reading, it is not necessary to give extensive instruction in drawing to accomplish the aim in a satisfactory manner. The following suggestions may be of assistance in doing this:

Blueprint reading requires two major abilities; (1) the ability to recognize views found on a print or drawing and visualize readily the complete part or machine which they represent and, (2) the ability to interpret all details given by dimensions and notes, or expressed by conventional methods used in drafting such as through the use of certain types of lines, sections, and symbols.

The ability to visualize a part by looking at views given on a drawing or print is a mental process which is much easier for some than for others. When teaching blueprint reading only, we should keep in mind that the method which develops the ability to visualize with least difficulty and in the shortest period of time is the best. This ability is not always developed best through the process of making extensive drawings. It may be developed in several ways with some sketching involved but this needs to be very limited. One of the methods used is the so-called "glass box method" demonstrated by the instructor after which demonstration most students wonder what in the world he has been talking about. Something easier to understand should be developed.

Making isometric drawings from working drawings and making working drawings from isometric drawings is used by many to develop the ability to visualize. This may or may not get the required results but in many cases it does not and it is sometimes tiresome and uninteresting. In some cases, models of objects are provided, made of wood, and drawings are required of them while others have used clay. The writer has found that a modified *glass box method* where students do individual studies with paper rather than glass is successful, quick, and easily understood.

The ability to interpret details after one has developed the ability to visualize an object from its views is somewhat the same as the ability to interpret what one reads after he has become familiar with words, sentences, punctuation, paragraphs, pages, etc. It depends upon the understanding of uses of lines, notes, sections, and symbols or conventions used to express ideas in drawing. The development of this ability will come through the study of drawings and prints on which these conventional methods of drawing expression are found. Thus it is highly important that the student become familiar with the conventional drafting methods in the quickest and most desirable manner. Reference material in the hands of each student is most satisfactory just as a dictionary is important in the hands of every reader learning new words and expressions through reading. It is possible that actual drawing will assist in this but it is not always true that writing words or expressions develops the ability to give them the proper interpretation when they are read.

It is customary to start reading very simple and elementary stories when one is learning to read. Likewise it seems more desirable to start reading simple blueprints. As one becomes familiar with the more simple drawings he can proceed to more difficult ones until he finally reaches a point where he can read any blueprint or drawing. This, of course, requires practice and time and considerable experience. Desirable reference material where information can be obtained readily will assist considerably in the development of blueprint-reading ability.

One method of assisting in the development of the ability to read blueprints is by means of assignments which may be furnished the student calling for certain information relative to drawings or prints furnished or found in books or in reference materials. These may be used by the student as study guides to call his attention to certain things that need to be emphasized, and his ability may be checked by reviewing his work to see whether or not his interpretations are correct. These assignments may be continued as long as desired.

Following such a course as this it is quite likely that the student in many cases will be interested in studying drafting to prepare for more highly technical blueprint and drawing work.

*Ypsilanti, Mich.

This Matter of Grades

D. C. MARSHALL*

What did you get in Arithmetic? Were you ever asked that question? You may have been almost afraid to pull the card out of the envelope to see what you did get. Grade card day was almost like Christmas morning when you dashed downstairs to see what Santa had left in your stocking and you had about as much idea in one case as in the other. Of course, if you had been good, you expected something nice from Santa, and on your grade card you probably got a 98. If you had played too much, or loafed on your studying, maybe it was only 79. I have often wondered by what mathematical process my teachers arrived at the precise figures that graced my report cards but I am glad that, as a teacher, I have never had to find out.

It was a big change from that to the five-point system. Many parents, who had

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received 98½, were not satisfied when Junior got an I that might mean anything from 93 to 100. They were bold and venturesome spirits who introduced the S and U system of grading. It was almost as hard to get teachers to use it, as it was to get some parents to accept this abbreviated code. More than once I have seen grade cards with S plus or U minus, whatever they might mean.

These changes have helped a lot to get the emphasis off of the grade. Some schools have gone farther and give no grades at all. At intervals, whenever the situation makes it desirable, the parents are informed by means of a letter from the teacher as to the progress or lack of progress of the child. That is really a fine step in the right direction but, knowing how teachers put off the matter of grades until the last possible moment, I am afraid the letter would never be written in many cases when it should. While this method is very progressive, therein lies its weakness. Teachers need a certain definite time set for issuing grades or, like myself, they will be so busy doing something else that the grades would never be sent out.

That being the situation, every few weeks the question must be answered, "What will I give Bill this time?" The days skip by and we have to do something, so we open up the old grade book and get the matter over. Maybe Bill thinks he should have had a better grade but he doesn't very often tell you. He may even think that you have overestimated him but there is even less chance that you will ever find it out. Grades aren't discussed with the student, at least not very often; they are held as a club over their heads to make them work when the teaching is so poor that there is no incentive to learn. If we want to make a really progressive step in the right direction, we can make the job of grading a cooperative task with the student helping. In most cases, they know more about what they deserve than the teacher does anyway, and it won't lower him in their sight to take them in on the job. Teachers never hesitate to call them in on nearly every other job that has to be done around the school.

That was the conclusion I reached and I decided to give it a try. Two weeks after the semester opened, while we were having class discussion, I told the boys that it would be each one's job to decide what his grade should be each six weeks. It caused quite a sensation at first. Some even thought I was spoofing. Of course, one or two made whispered remarks and I heard one fellow say, with a broad grin, "I'll get an I this time." One or two said they didn't know anything about what they ought to have and that it was my job to decide that question, but the great majority took the announcement in stride, and made no comments either for or against it.

This first announcement was followed up with repeated reminders that each one should be checking up on himself. In addition, the things which determine the grade in shop were explained so that the boys would have some idea of how to rate themselves. Our grade cards are in folder form with a place for teacher's comments and parents' comments each six weeks. The more I thought about the matter, the more I was convinced that I should go *whole hog* and let the boys write the comments of themselves, by themselves, to their parents.

When the end of the six weeks arrived, I was as eager to see what was going to happen, as students are to see what grades they have received. I set aside a portion of several class periods to discuss the grade with each student individually. When the class was at work, I would take a chair over in one corner of the shop away from everyone and called the first boy over.

"What do you think your grade should be for the six weeks?"

He studied a moment. "I think it should be an S."

"Why?" I asked.

"Well, my work is pretty good, and I have done quite a little. I have completed two jobs."

That agreed with my own estimate and without comment, I recorded the grade.

"Now, what are you going to tell your parents about your work?"

He studied longer this time. "I think I can do better work as I go along and I think I can work faster. I have wasted some time this six weeks."

I thought that was quite an admission for a boy to make when he knew that it was going to be sent home as his message to his parents. The first test was over and I commenced to feel better, already.

The more boys I talked with, the more interesting the process became. It wasn't nearly as bad as trying to make out grades by myself. One little chap said, and the tears weren't very far back from his eyes, "I guess my grade should be U."

When I asked for his reasons, he explained, "My work isn't very good."

"Bring your last job here and let's have a look at it."

He brought a little bookshelf which was just about ready for the finish. It looked pretty good to me. The shelves were square with the ends and it had been well sanded. The only fault I could find was that he had forgotten to sand the curve on the bottom of each end. I pointed out the good and bad points of his work to him and then he said, "But mine isn't nearly as good as Jim's."

"Yes, but Jim is older than you and then he has a workshop at home and has done a lot of work before coming here. This is your first experience with tools and we are comparing you with what you are able to do. I think you should have an S for this kind of work." A smile broke through and he was a very happy boy. "Now what are you going to tell your parents?"

No hesitation this time. "I have wasted some time and I know I can do better. I ought not to argue politics with other boys when I should be working."

While it isn't such a job to decide grades on a two-point system, making suitable and worth-while comments to each parent is quite a job and I wasn't surprised that many boys did not know what to say. When the job had been completed, I found that no one had given himself a better grade than I would have given him, and in many cases, the comments were much better than I could have made. In our advanced classes, it is necessary to grade on a five-point system so that the students will have grades to take to college with them. Some time, the colleges, or at least some of them, may wake up to the fact that grades aren't so important as teaching boys and girls to become happy, useful citizens. When that happens we won't have to use two grading systems just for their benefit. While it is lots more difficult to grade on five points than on two, I found that the boys had made estimates that tallied very closely with mine. The greatest exceptions were those who rated themselves too low. When I found the rare case where I thought the grade was too high, I asked the student to read the items listed on the grade card that explained the basis for making classifications and after weighing the matter in the light of this, there was just one who insisted that his grade was not too high and I let it stand where he placed it and never let on that I had made a previous rating on his work.

What are the advantages of letting the boys grade themselves? They have a pretty good estimate of what they have done and what it is worth in terms of grades. If they haven't, it is high time that they learn how to grade themselves before they get out of school and start out on a job. Deciding on their own grades makes them study their work more closely, and how they have used their time. When they have to write it down in a letter to dad and mother that they have been wasting time, it takes on a different meaning than when the teacher writes it. When he takes his report home and the parents learn that this is his own rating of himself and his comments about himself, then if the result doesn't look right, he is likely to resolve that it will look right the next time. It is going to be worse if he has to write down that he has done things in the shop that he shouldn't have done and that he has annoyed others and kept them from working.

In our case discipline problems disappeared in a short while, and grading, instead of being a chore, became an opportunity to get better acquainted with the students.

Twenty years from now, if schools abolish grades, as some of them have already done, these boys — the future patrons of the school — are not going to be worried very much by the absence of a grade. They will have learned that a boy's estimate of his own work is more valuable than that made by the teacher, providing that the estimate has been arrived at in the proper way.

ALLOWANCE FOR WAR-PRODUCTION TEACHING TOWARD SECURING A STANDARD VOCATIONAL TEACHING CERTIFICATE

CHARLES F. ZINN*

During the next several years many persons now teaching war-production training classes may wish to have provisional vocational industrial certificates made permanent. Many states require evidence of successful teaching experience in the fields indicated on the certificate as part of the requirement for making certificates permanent. No attempt is being made in this brief article to detail the various requirements established by states or to indicate the specific requirement of any one state.

Most requests for having certificates made permanent will be received from persons who are interested in teaching all-day unit trade vocational industrial subjects. Some of these persons may have taught both day trade and war-production training courses. Others, although holding some form of temporary certificate, may not have taught in day trade schools or departments. The question to be discussed is, "What is a fair allowance for war-production teaching as experience toward making a vocational industrial certificate permanent?"

Most of the responsibility of war-production training instructors is to prepare persons who have left school, or mature persons of considerable working experience, for employment in war-production jobs requiring a limited range of skill and technical knowledge. The objective of war-production training is not primarily broad background preparation for lifework as a craftsman. War-production training is an attempt, and a successful one, to fit an individual so that he can produce effectively on a specific job in the shortest possible time. There is little time for consideration of *related* instruction which does not directly contribute to his job ability.

Many war-production trainees are employed and receive pay during their period of training. This usually results in highly efficient training, since it is known specifically what job the individual must fill at the end of 100, 200, 300, or 400 hours of instruction. The individual is motivated by the desire to *make good* and to be placed in higher wage classifications in the shortest possible time. Both trainees and instructors are hewing very closely to the line — that line being job competency in the shortest possible time.

In general, war-production trainees are mature persons. This is not a designation that can be applied to individuals who have attained some specific age; it is a matter of the acceptance of responsibility. War-production trainees are faced with very specific job responsibilities and job opportunities. The approach to motivation, management, and instruction of such persons and groups, although not differing in basic psychological concepts, does differ materially from problems facing the day trade instructor who has within his shop students ranging from 14 or 15, to 18 or 19 years of age.

Instructors who are handling war-production trainees are concerned with objectives which frequently may be obtained, in part, within one hundred hours. This may be a relatively simple and a single objective, such as the training of a tack welder. The day trade instructor is concerned with two, three, or four years of instruction which embraces broad basic preparation in the fundamental skills, trade theory, and related information pertaining to a family of occupations, such as the machine trade, electrical trade, building trades, etc., which make up a craft. The day trade instructor also must consider instruction which will be offered to his shop students by other persons. This will include most of the organized related instruction. He also should be interested in being helpful to students in terms of their nonrelated preparation, which includes English, social subjects, and other aspects of the all-round development of an individual through a program of secondary school grade. The day trade instructor is faced with the problem of developing cordial relationships and successful professional contacts involving a rather wide sphere of persons and activities. His responsibilities are not in any matter transient. The day trade instructor frequently is responsible for both the placement and follow-up of his graduates. He expects them to return to evening school for additional instruction and upgrading after they have been employed.

The list of responsibilities of the day trade instructor could be expanded considerably, but perhaps those cited are sufficient to illustrate that, although an instructor may have been highly successful in teaching war-production training classes, it will be necessary that he discharge many additional obligations before it will be definitely known that he is a successful instructor of vocational industrial (all-day unit trade) students. It, therefore, appears inadvisable to accept war-production training teaching experience in lieu of all "approved vocational industrial teaching experience" which may be required in making a standard vocational certificate permanent. Successful war-production training experience is a splendid asset and recommendation for any instructor; it indicates his ability to handle many critical instructional situations, some of which may not occur under day trade teaching.

It is suggested that persons holding provisional vocational industrial certificates, and wishing to make these certificates permanent, be permitted to present successful war-production training teaching experience not to exceed one half of the total teaching time required by the state for making a standard vocational certificate permanent. This would infer that if, in a given state, four years of successful "vocational industrial teaching experience" are required, an instructor who has taught all-day trade classes for two years and war-production training classes for two years would be permitted to present this service as the *teaching experience* requirement for making a certificate permanent.

No doubt many arguments can be advanced which would indicate that greater or less time be accepted. In any case credit should be given for those aspects of war-production teaching which are indicative to success in day trade instruction, and which contribute to success in this field. Balanced against these advantages are certain necessary experiences which are not likely to be obtained through war-production instruction, making it desirable that an instructor secure adequate experience in instructing day trade students before a teaching certificate in this field is made permanent.

Having been from my youth more or less engaged in public affairs, it has often happened to me in the course of my life to be censured sharply for the part I took in them. Such censures I have generally passed over in silence, conceiving, when they were just, that I ought rather to amend than defend; and when they were undeserved, that a little time would justify me. Splashes of dirt thrown upon my character, I suffered while fresh to remain; I did not choose to spread by endeavoring to remove them, but relied on the vulgar adage *that they would all rub off when they were dry.* — *Benjamin Franklin.*

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INDUSTRIAL ARTS AND VOCATIONAL EDUCATION

John J. Metz, Editor

Our High Schools

In these days when it is frequently claimed that our educational system is all wrong, and that the high schools are not training students for life, it is heartening to hear that the University of Chicago finds it possible to start a four-year college course with students who are about to enter their junior high school classes.

Evidently that great university feels that the high schools of the country have done something for students who have attended for two years. Probably some may wish to retort to this observation, that training that fits for college entrance does not necessarily mean training for life, but it must be remembered that to a large degree the leaders in life are men who have received college training. Looking at it from this viewpoint our high schools are doing a valuable job.

Another pointer which indicates that our high schools are accomplishing things with their students is the annual nationwide Westinghouse science talent search. The contestants must take science aptitude tests, write essays, and present personal and scholarship records.

Of course, only the cream of the teen-age high school students of the nation have a chance at winning one of the prized Westinghouse science scholarships, but again, the contestants are boys and girls who have obtained from their high school courses the knowledge needed to compete in these talent search tests. The fact that the high school students who have been selected in this nationwide science talent search to compete in final examinations for this year include 29 boys and 11 girls from 17 states testifies to the fact that good high school courses are not limited to any single locality in the United States.

Of course, the foregoing does not show that our high school courses cannot be improved, but it does show that the material taught there does fit students for some very definite purposes in life. Probably when our high schools adopt more courses of the cooperative training type, where the students spend part of their time at school, and part of it in some occupation, a closer approximation of the training for the life ideal will be obtained. At any rate, the necessity for changes in the high school curriculum will then become more apparent and the needed adjustments can be made more easily.

Industrial Arts in the Next School Year

Industrial-arts teachers may do well to start planning for the next school year right now, and in their planning it might be well to consider a few ideas that will materially help to make industrial arts much more vital in the lives of the students on the junior high school level.

In many school shops the outline of instruction may not need much alteration to fit into a general streamlining of industrial arts, but it may need a shifting of emphasis to points that now seem more important than they did when last year's outline was set up.

For instance, one point that industrial-arts teachers should not overlook is that they must definitely plan on making their courses more available to girls than they did in the past. In some states the attendance of girls in industrial-arts shops has increased to a great extent, but too many schools have not as yet seen fit to offer this type of work to any but the boys. Present-day scientific advances in home, office, and factory make it practically imperative that girls should know much more about the mechanical and electrical appliances with which they come in contact, than was necessary in the past.

Another point is that simple blueprint reading needs to be emphasized much more than it was in the past. Also that the drawing given in industrial-arts courses should embrace more than just the machine drawing usually given.

Still another thing to emphasize is the question of skills. It is true that elementary industrial-arts students may not be able to develop a high degree of skill in the few hours per week that they are in the school shop. Nevertheless, such skill as can be reasonably expected should be insisted on, and a serious attempt should be made to raise the standards of the work produced to as high a level as is consistent with the capabilities of the individual student.

With the shortage of shop teachers in mind, and knowing that many teachers who have left for the armed forces or to enter industry may not come back, every shop teacher should survey his classes carefully for suitable material out of which future teachers can be fashioned. This problem of supplying new teachers deserves careful study and every teacher should help to solve it.

As already said, the foregoing may not require major changes in the industrial-arts courses which were given last year, but the suggestions given should be studied and embodied in the present course to make the work more efficient and worth while for the next school year.

Closing Up For The Summer

Under present conditions, and really under any conditions, it is deplorable that the doors of the school shop are locked up during the summer months. The value of the school shop could be made so much greater in the life of a community if it continued to operate and act as a rallying point for the boys and girls who spend their time, mostly without supervision, throughout the summer vacation.

At present the school shop, if it were in operation during the summer, would undoubtedly do much to decrease the rate of delinquency which now is at such a high level. However, the shop teacher is not the one who can determine whether or not his shop is to be operated during the summer term. He must do as he is told.

Taking this into consideration, the following is merely an abbreviated list of duties that can be glanced over to see whether the things that are to be done before leaving the classroom for the summer are properly attended to.

1. Have the bench tops, supply racks, shelves, and the like, been cleaned and refinished properly?
2. Have the reference books been looked over for needed repairs or replacements?
3. Has the inventory been brought up to date?
4. Have the shop and locker keys been turned over to the proper person?
5. And lastly, have you left your forwarding address so that, if anything goes amiss with your shop, you can be promptly notified?

Inspiring Discussion

F. L. TEMPLETON*

At one of the meetings of the Indiana Industrial Education Association for District 7, a unique idea was used in order to get a thorough discussion of the problems facing teachers of industrial arts in this district.

The speaker had prepared sets of cards grouped in three different colors. Each person at the meeting was given the complete set of cards. The white cards were stamped with words which indicated some of the activities taught in the industrial-arts shops in this district. The green cards indicated some of the anticipated goals of the different fields of industrial arts. The red cards showed some of the possible objections which might be offered to certain phases of instruction in industrial arts. The following were the statements on the different sets of cards:

*Assistant Principal, High School, Bloomington, Ind.

red	*white*	*green*
methods too old	wood turning	efficiency
crude projects	farm shop	joy in work
no variety	automotive repair	value of precision
too dirty	printing	pride in ability
no demand	patternmaking	good design
no interest	electricity	fundamental skills
too difficult	wood finishing	good workmanship
encourages laziness	carpentry	self-discipline
equipment too old	foundry	industrial appreciation
too dangerous	cold metal	industrial interest
too limited	home mechanics	production
too costly	bench woodwork	industrial exploration
too easy	metal lathe	consumer's knowledge
no trained teachers	sheet metal	cooperation
not practical	drafting	self-reliance
too formal		

After the cards were passed to the members in attendance, the speaker asked one of them to select one white card at random from his hand. For instance "wood turning" might have been the card selected. The speaker then asked each member to select the same card from his group of white cards and place it on the table before him. Then they were asked to take their green cards and select from them those statements which indicated goals and aims which each teacher felt he was trying to accomplish by teaching this particular subject in general shop. These green cards were placed to the right of the white card in solitaire fashion.

Allowing a few minutes for each of these selections they were then asked to take the red cards and select those which might indicate objections to "wood turning" and place such red cards to the left of the white card selected. As soon as this was completed he then called upon individuals at random to pick up one of his green cards (for instance, "efficiency") and tell the group what he was doing in teaching "wood turning" which he felt would develop efficiency in a student. If his explanation was satisfactory to the group, another individual was selected to pick up another green card and defend that idea in connection with "wood turning."

It was found that this method provoked quite a bit of interesting discussion as to how different individuals were achieving aims which they selected.

Having covered the positive side of the program, we then asked a certain individual to pick up one of his selected red cards and in like manner defend his choice of that card as an objection to the phase of industrial arts under discussion. When the pros and cons of this first activity were fairly well completed, we had some individual draw another card from the white group and proceed again in the same manner to discuss its advantages and disadvantages.

The men attending this meeting were very much impressed by the idea of provoking discussion through this method. The only difficulty was that we could not nearly cover the fields of industrial arts which were indicated in the set of white cards. The teachers asked for a return engagement in order to complete the discussion of the different activities listed. We believe that other groups of industrial-arts teachers might find this method very profitable in developing their discussion.

An Open Letter to Absentee Industrial-Education Teachers

EMANUEL E. ERICSON*

As a part of the disorganization caused by the war period, hundreds of industrial-arts and vocational teachers have severed their connections with school shops in all parts of America. A small number of this group have been drafted, many more have enlisted in the various types of the armed services imbued with the patriotic feeling that by this action they can be more directly helpful in the total war effort. Others have obtained leave of absence or resigned to enter various phases of industry either for the reason that salaries are far greater outside of schools, or because they have felt that it is their duty to lend their skill in various production achievements. Whatever the reason for leaving, the schools have suffered a loss at a time when practical-arts instruction is more essential to the lifeblood of preparation of youth than it has ever been in the history of American education.

This article is not written, however, for the purpose of lamenting the fact that these men have left the classrooms nor to pass judgment as to whether their chosen or assigned activities are of greater long-term value than would have been their continued work as teachers in school shops and laboratories. It is written rather for the purpose of making some suggestions through which the substituted activities chosen or accepted by these men might eventually make their period of absence contribute to greater efficiency in future practical-arts teaching in the afterwar period about which we are all speculating at this time. With this thought in mind, the following suggestions are directed to those teachers who have left the teaching profession as a temporary measure and intend to return to their former jobs, considering as they do their present situation only as a temporary one. Other teachers who are still on the job, but who

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spend a part of their time in industries, may also be included.

1. *Take advantage of technical experiences:* The majority of practical-arts teachers who have either gone into the services or into industry are doing some type of technical work. This technical and mechanical work can be made a very definite part of one's increased preparation for teaching in public schools. The types of work engaged in are usually quite important and advanced — far beyond the possibilties they had in the school program with its limitations of equipment and supplies. However, with the conscious thought of applying these technical processes and skills to future educational programs, the teacher who is now in industry will be able to accumulate a fund of knowledge about new methods, processes, new projects, and new equipment, all of which he may be able to carry out in his teaching program when he returns. A notebook or a diary kept carefully, indicating suggestions and possible applications for the future, will be a great source of usefulness at a later time. Information regarding the newer metals, new machines, tools, and instruments, new mechanical processes, new motor equipment for air and ground transportation, and similar informative matter might be fruitful of rich future results.

2. *Broaden socially:* The teacher's life usually is a rather confined one, although the practical-arts instructor has more opportunities to make contact with the outside world than do most other teachers. In industry and in the armed services, however, the teacher who has spent a number of years in the classroom will find new opportunities of learning how other people think and what kind of a world those who are now students are destined to live in. Here is an opportunity for teachers on leave to acquire broader understanding of human nature, to develop more tolerant attitudes toward those who think differently, and to obtain a liberal knowledge of the many varied occupations which are open to youth. All of this can be done by one who is generally interested in human beings as they are, without personally becoming demoralized or contaminated. Going back to the classroom from these broad contacts should make a teacher more valuable to his students and his administration.

3. *Broaden culturally:* Life outside of the schoolroom may offer to the teacher on leave a larger opportunity for cultural development than he would have if he had stayed on his teaching job. Particularly in the armed services are there chances for travel; for visiting faraway places; for seeing how other nationalities and races live; for coming in contact with fine arts and fine literature; and for mingling with great personalities and with men of broad experience. It is true that in industry the hours are long, and that much of the activity in the war may not be classified as cultural development, but it is also true that "as a man thinketh in his heart so is he," and that in many phases of the war effort some leisure time is available which can be used for broadening one's knowledge of worth-while things.

4. *Develop postwar responsibility:* There is a common saying on the home front that those in the war will be the ones to determine postwar policy. This is probably to a larger measure true of teachers than any other group. Teachers who are in the service or in industry are having splendid opportunities to see the perspective of afterwar needs much better than those who remain in the classroom. If conscious of this responsibility now, teachers on leave can accumulate a great deal of information and data; and they can mature their determinations along lines of activity that may be carried on after their return. Few other social agencies will have more responsibility than will the public schools for guiding the thinking and course of action to be taken in the postwar world. Teachers who have been out of the schools may well be expected by those who stay home to come back and take the leadership in educational reconstruction.

5. *Accept leadership responsibilities:* A teacher who enters industry or the armed services should not forget that he has been a teacher, and he should boldly take the attitude that having had responsibility in high schools for shaping the thought and action of youth, he should now carry with him the same responsibility, meeting as he does the youth of high school and junior college age. Here seem to be opportunities for education to expand itself outside of the walls of our school buildings; for educators should be educators regardless of whether they are in the school or out of school. They should carry with them the same eagerness to assist youth in finding itself occupationally, socially, emotionally, as they would if they remained in the employ of a board of education. The youth who have left school are badly in need of guidance, and teachers who have also left school, can best give it to them.

Probably to some, these points of advice may sound naïve. Perhaps it is too much to expect that a teacher should always be a teacher whether in school or out of school. It may be too much to expect that in the cruel business of winning a war we should constantly keep in mind the welfare of the other fellow. However, it is hoped that the education of our teachers in the past generation has been such, and that their idea of their responsibility to humanity at large is so deeply rooted that they cannot forget the challenge that they have accepted to so influence our youth that they will more definitely organize their lives upon the basis of "love thy neighbor as thyself." Teachers so trained will be willing to contribute their efforts to establish in this country an attitude toward helping other nations as well as our own to improve their condition and their mode of life.

The Printing Teacher and the War Effort

HARRY K. GARDNER*

How can the printing teacher help in the war effort? It was not much of a problem for the machine-, electrical-, or wood-shop teacher to fit into the scheme of National Defense, as their jobs were prepared for them at the beginning, but if the printing teacher wishes to take his place in the home-front ranks, he can make that place for himself, with little effort and the materials he already has at hand.

The printing teacher is in a position to take a most important part in the war effort. He can become a master salesman of war bonds and stamps, not only to the pupils and teachers of his school, but to the parents of the pupils as well.

How? The answer is simple. Start a tabloid newspaper devoted to the sale of war bonds and stamps, and the Education Department, War Savings Staff, Washington, D. C., will furnish the material for the sales talks.

It is not necessary to think in terms of an elaborate periodical, of large proportions; the job can be done, and done well, with a paper of very modest size.

Our paper is the 4-page pamphlet type. Size of sheet, 8 by 9½ in., type size, 20 by 40 picas, pages, 4¾ by 8 in., and printed on ordinary newsprint paper. A paper of this size will be small and economical both in size and labor, but efficient.

If the pupils are able to set a simple

*Junior High School No. 46, Baltimore, Md.

paragraph, the labor problem of type-setting is solved. If the equipment is limited, the job can still be done.

Our junior high school has the average print-shop equipment found in most junior high schools, and we find it ample to publish a paper every other week, and still take care of the ordinary run of school printing that most of the school print shops fall heir to.

We started our little publication in 1925. In those days our equipment was almost nil. We had 60 pounds of 10-point type, one 8 by 12 Gordon press and a handful of leads and slugs. We had no stone, no wood furniture, no job type, no motor or treadle for the press; but we had a little imagination and a strong desire for a school newspaper. What we lacked in essential equipment, we improvised. The wood shop furnished wood furniture. The home-economics department provided a discarded marble-top washstand for an imposing stone; where we should have used job type, we used caps and small caps, and the boys working in "pumping relays" back of the press furnished the motive power. In this manner we published quite a few of our earlier editions. It was tough going, but our ambition was realized. We had our newspaper.

We are happy to state that we are still in publication, and the above handicaps have disappeared; also that we have dedicated the paper to the sale of stamps and bonds for the duration of the war.

The details for a project of this kind are simple, and any printing teacher can carry them out without interrupting his daily routine or being overburdened with work. The following few suggestions may be helpful to those who desire to help the war effort and probably also to continue the publication of the paper after the victory is won.

Organize a printing club with the most efficient pupils in your classes. Twenty members is the minimum number for the size of the paper mentioned. The club may meet one afternoon a week, after school, or, if there is an activity period in the schedule, use that. If the equipment at hand will permit, set aside twenty cases of type, and label each with a club member's name. In this way each member will have a feeling of ownership and responsibility. However, it is not absolutely necessary that each student have it.

One forty-five minute period is all that is needed to set the type, provided the copy is properly prepared and the shop is in condition to start work immediately upon arrival of the club members.

The copy should be cut into *takes* of one paragraph each, and numbered. The sticks should be set to measure by the teacher in order that all the composition will be the same width when completed.

As the takes are finished they should be dumped, one after the other, on a galley. When the entire job is completed, the takes can then be arranged in their numerical order. The whole job is now ready to be proofed and read. The corrections should be made by one or more capable boys as a class project. The simple make-up of the four pages can be done by a pupil or by the teacher himself. Next, lock it up and print it.

At the next meeting of the club the type is distributed, and plans for the next issue discussed. As a reward to the club members a special service certificate should be awarded in appreciation of his efforts in behalf of the school.

Setting the type one week and distributing it the next gives ample time to prepare the material for the next issue, besides keeping the club busy and interested.

It the club arrangement is not practical, all of the foregoing may be accomplished by capable boys as a class project. This method will be slower, and the publishing dates may be more or less irregular.

School news may be obtained through such sources as class correspondents, school reporters, newspaper club, the teachers, principal's secretary, the printing club, the student patrol, or any of the several organized groups in the school.

Rules for the preparation of copy should be few and simple, but strictly adhered to on account of the limited time allowed for the completion of the project. They may be as follows:

1. Keep the paragraphs brief.
2. Write on one side of paper only.
3. Edit all copy so that typographical errors may be kept to the minimum.
4. Have a deadline time for receiving copy for publication.
5. Accept no intricate composition for publication.

These few precautionary measures, if carried out, will greatly simplify the entire procedure.

A school publication, no matter how small, if delivered to the pupils at regular intervals, soon becomes an established institution of the school. It lends prestige to both the school and the printing shop. It is an important interest factor in the subject of printing, and the aim of most pupils is to become *good enough* to work on the school paper. The principal and the teachers value the paper as an outlet for information to the entire school, and give full cooperation toward its success.

CHECKING OUT 600 MACHINIST TOOLS IN A FEW MINUTES

CHARLES F. MARTINETZ
Samuel Gompers Vocational High School
New York City

One of the greatest problems confronting a machine-shop teacher is the checking *out* and *in* of hundreds of hand tools and accessories for machine tools to large classes.

The problem is manifold:

1. *Discipline:* Students are anxious to get started at the earliest possible moment. Having a large group of students wait in line at the toolroom window for ten, fifteen, twenty, or more minutes to obtain their necessary tools causes many discipline problems. The same problems arise when turning in tools at the end of the session.

2. *Condition of hand tools:* The condition of all hand tools given out should be as perfect as possible from the standpoint of *safety* and to help the student develop the best workmanlike habits.

3. *Machine tool accessories:* All wrenches and accessories should fit the particular machine tool for which they are issued.

4. *Prevent loss, abuse, and the like:* To prevent the loss, abuse, misplacement, or substitution with inferior tools is every shop teacher's daily concern, unless he works out a good checking system suitable for his shop.

5. *Number of teachers using shop:* Another problem which particularly complicates matters during the present war period is the War Industries Training Program classes which use the shops, and where as many as ten teachers may use the same shop during a 24-hour period. When such a condition exists there is a tendency or desire on the part of each teacher to have his own set of tools, causing duplication, and much waste.

Considerable thought was given to these various problems. After consultation with Morris Shapiro, principal of the school, and Walter N. Schuhmacher, chairman of the machine-shop department, the writer designed and made a model toolbox or kit to hold 14 basic machinist's hand tools.

In designing the hand-tool box, six important points were kept in mind:

1. To make strong, sturdy hand-tool boxes which could stand much handling by many students and by many classes.
2. To have the hand-tool boxes as compact as possible, so that they would not take up too much room at each work station.
3. That all 14 basic hand tools should be easily and readily accessible from all hand-tool boxes.
4. To have all hand-tool boxes numbered on all four sides with large numbers for easy identification.
5. That all 14 basic hand tools can be checked at one glance by the toolroom attendant against loss.
6. That all number markings on each individual hand tool in the hand-tool boxes are visible at all times, in case of checking for misplacement of hand tools.

Fifty-one hand-tool boxes were made of maple. Tongue-and-groove joints were used throughout their construction. The size of the hand-tool boxes is 6 by 8 by 11 in., external dimensions, with a center section extending 6 in., through which three 1-in. countersunk holes form finger grips. See Figure 1,*

Fig. 1. Hand-tool boxes with fourteen compartments

which shows three empty hand-tool boxes so that front, top, and side views can be seen. These views show the 14 compartments, and

*All photographs were taken by Joseph Leeb, radio mechanics teacher, Samuel Gompers Vocational High School.

Fig. 2. Hand-tool boxes filled with tools

the large numbers that were put on all four sides of the toolboxes. Figure 2 shows the boxes filled with the tools.

Each of the hand-tool boxes contains the following 14 basic machinist hand tools: 6-in. steel rule; single-pointed scriber (made from 3/16-in. drill rod); 4-in. divider; center punch (made from ⅛-in. drill rod); 6-oz. ball-peen hammer; 9- or 12-in. combination square; hack saw; 8-in. or 10-in. flat second cut file, with handle marked with one black groove; 8-in. flat smooth file, two black grooves in handle; 8- or 10-in. second cut pillar file, one

Fig. 3. Hand tools when laid out, take up an area of 16 by 32 in. Hand-tool box in the background holding all 14 tools in a vertical position takes up an area of 6 by 8 in.

red groove in handle; 8-in. smooth half-round file, without groove in handle; 8-in. smooth square file, two red grooves; 8-in. smooth round file, two green grooves; file card and brush.

Figure 3 shows that the hand tools, when spread out, occupy an area of 16 by 32 in., but that when they are arranged in the hand-tool box, they take up an area of but 6 by 8 in.

All hand tools are numbered to correspond with the number on their respective hand-tool box. The 6-in. steel rules and the combination square rules have numbers burned in four times with an electric pencil at both ends and at both sides. The room number and the school's initials are also burned into the rules to prevent and discourage the substitution of cheaper grade steel rules. The hardened combination square heads are numbered in the center of the 90-deg. measuring surfaces. The 6-oz. ball-peen hammers are numbered three times, the top of the hammer head has a number burned into it with the electric pencil, and numbers ½ in. in height are branded into opposite sides of the hammer handles. The hand hack-saw frames, dividers, scribers, and file cards and brush have the largest possible numbers stamped into them with steel numbers and in as many places as possible.

To make files readily distinguishable to the students, while in the hand-tool boxes, grooves ⅛ in. wide and 1/16 in. deep were cut into the file handles. These grooves were then painted with black, red, or green enamel. Numbers ½ in. in height were branded on opposite sides of the file handles after which the handles were given two coats of varnish. The half-round files have no grooves; only numbers are branded on opposite sides of file handles.

The weight of the hand-tool boxes with the 14 hand tools is approximately 19 lb. After the war, these boxes can be made from sheet metal or cast from aluminum to reduce their weight.

For the 11 engine lathes in the shop, birch boards, 2 by 14 by 14 in., were used to hold the most frequently needed tools.

Depressions in the shape of each tool are carved into these boards as shown in Figure 4. A glance at the board suffices to show up any missing tools. The cavities were carved deep enough to keep all tools ⅛ to ¼ in. below the surface, especially those for the shallow tools, like wrenches, which might otherwise slip out when tool boards are being carried from and to the toolroom. Large finger and thumb notches were carved out for certain tools to provide easy and quick removal of the tools.

Fig. 4. Lathe tool board with depressions for each individual tool

Fig. 5. A tool board holding sixteen tools for a 11-in. South Bend Lathe

Figure 5 shows such a tool board which holds 16 tools for a 11-in. South Bend Lathe. The tools on this board are: screw driver, for offsetting tailstock of lathe; wrench for change gears; chuck wrench for 4-jaw independent lathe chuck; chuck wrench for 3-jaw

Fig. 6. The tool board in its place on the engine lathe

universal lathe chuck; threads stop; 3-in. outside caliper; 3-in. inside caliper; Allen wrench for compound rest; pin, which is used as a key for the drill chuck; tailstock center; headstock center and tapered spindle sleeve combined; toolholder wrench; 6-in. steel rule; tool post wrench; tailstock wrench; 1-in. micrometer caliper.

All lathe tools are numbered to correspond with the number on the lathe tool board and on the engine lathe to which they belong. To distinguish the 6-in. steel rules in the hand-tool boxes from those found in the lathe tool boards, the latter are marked L-1, L-2, L-3, L-4, etc. The 1-in. micrometer calipers are stamped or marked the same way on both sides of the frame to distinguish them from other 1-in. micrometers used in the shop.

All of these tool boards are marked with numbers 2 in. in height, carved in the lower left-hand corner. Figure 5 shows the lathe tool board belonging to engine lathe No. 7.

Figure 6 shows the lathe tool board in its place on the lathe. Each tool is readily accessible to the student. Each of the tool boards has a turned hub 3-in. in length fastened at an angle of 30 deg. to the underside of the board, as shown in Figure 7. The hubs fit snugly into pipe stands which are permanently fastened to each lathe. The boards may be swiveled in any direction, and be mounted and dismounted readily.

The writer has been using these lathe tool

Fig. 7. The angular hub fastened to the underside of the lathe tool board

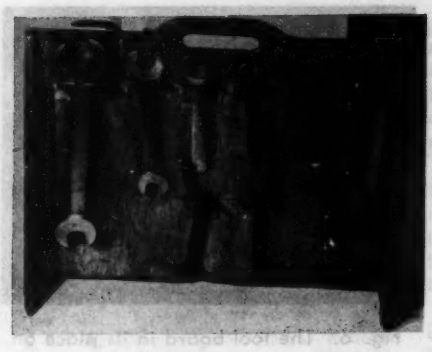


Fig. 8. One side of a tool board stand used for a No. 1A Brown & Sharpe Universal milling machine

boards for a number of years and has found them very useful and efficient.

Figure 8 shows one side of a vertical type milling machine tool board stand used for a No. 1A Brown and Sharpe milling machine. This tool board stand was designed and made by Walter N. Schuhmacher, chairman of the machine-shop department at Samuel Gompers Vocational High School. The illustration shows nine wrenches, such as arbor wrench, milling-machine vise wrench, vise bolt wrench, etc.

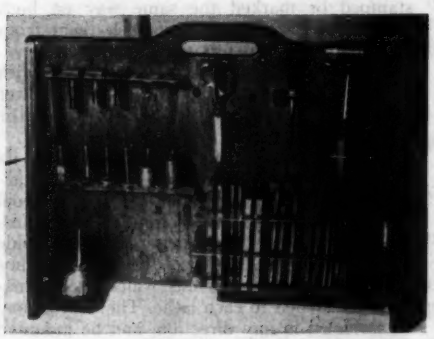


Fig. 9. Reverse side of the vertical milling machine tool board stand

Figure 9 shows the other side of the same tool board stand, which holds the following items: small oilcan, for oiling arbor bearing; rack for holding arbor collars; rack for holding vise, index head, and footstock bolts and washers; 3-in. varnish brush for cleaning milling cutters and chips; soft copper hammer; "T" slot cleaner; small screw driver for sector arms on index head; 16 sets of parallels, beginning from ⅛ in. square by 6 in. to ⅜ by 2 by 6 in.; scissors for cutting strips of paper to be placed on parallels.

The vertical type milling-machine tool board stand holds from 53 to 65 items.

Figure 10 shows a partial view of the hand-tool boxes and lathe tool boards on the racks in the toolroom.

All students receive mimeographed instruction sheets regarding care of hand-tool boxes, lathe, shaper, and milling-machine tool boards, and system used for checking. Students are cautioned against *dropping* or *striking* toolboxes or tool boards against machines or workbenches.

Every day, each student in each class is assigned by the teacher to his work station, depending upon the student's job on hand. The teacher then marks the information on a master assignment sheet, showing date, time, bench, lathe, shaper, milling machine, drill press, or grinder work station. As an important safety factor no student is permitted to work on any machine unless he has been assigned to it by the teacher.

The master assignment sheet is used for checking cleanliness of each work station at the end of the session, and also as a check sheet for rotating students from benchwork to machine work and vice versa.

ing, broken, or abused tools, or for substitutions with any inferior tools such as cheap steel rules or die-cast micrometers, together with the condition of toolboxes and boards.

Check sheets are kept for each class, which show date, time, and number of toolbox or board given out. It also shows other miscellaneous tools given out such as drills, taps, tap wrenches, dies, diestocks, milling cutters, etc. Each check sheet is turned over to the teacher at the end of the working session. This method enables the teacher to recheck students who have used tools from the toolroom.

Fig. 10. Partial view of the toolboxes and tool boards on the angular racks in the toolroom

At the beginning of the assignment, students are given a five-minute inspection period for the following reasons:

1. To inspect the outside condition of hand-tool boxes and tool boards.
2. To inspect and see if any tools are missing.
3. To inspect all tools individually for breakage or abuse.
4. To inspect to see if all tools are numbered the same as the toolbox or boards.

Students must report to the teacher immediately if anything is wrong with the toolboxes or boards or their contents. After the five-minute inspection period is over, each student is held strictly responsible for any missing tools.

With this system, over 600 basic tools can be given out in a very short time, thus getting many students started working as quickly as possible. Only after all toolboxes and boards are given out, many students draw out other necessary tools, such as drills, reamers, drill press vises, etc.

This tool system also reduces the traveling of the students to and from the toolroom; reduces the number of discipline problems; gives the students more time for actual work; saves wear and tear on tools; and tools are quickly checked at the end of the shop period.

Problems and Projects

ORNAMENTAL TIN CRAFT

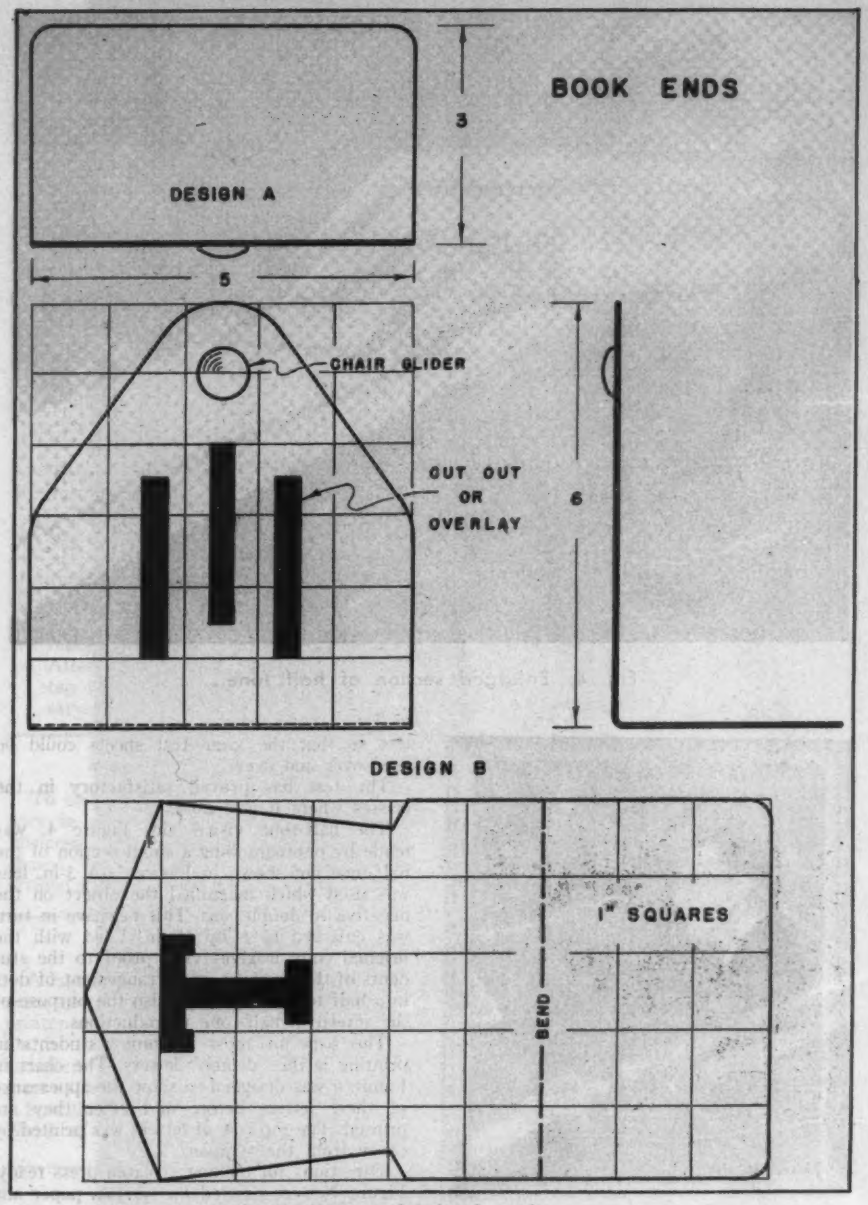
CHRIS H. GRONEMAN
Industrial Education Department
A. & M. College of Texas
College Station, Tex.

(Continued from page 199 of the May, 1944, issue)

Book Ends

A desk set would not be complete without this pair of book ends to match the design of the other projects. The book ends are relatively easy to make and the results will satisfy the most interested craftsman. They offer more possibilities for individual design

Book ends



Designs for book ends

than almost any other of the desk accessories. Do not cut out too much material by piercing, because the upright portion must be sturdy enough to withstand the strain of books pressing against it.

The size suggested in the illustration is quite suitable for these book ends and should not be changed too drastically. The blacked-out portion may be cut or pierced, or overlay pieces may be sweat-soldered in place. When overlay is used, it should not be peened because it will not contract with the remainder of the book end which has been peened on all visible surfaces. The bottom of the book end should not be peened. Since this project is one of the most attractive of the desk set, every precaution should be observed to secure an excellent copperplating.

After the book ends have been lacquered, the underside of the bases should be covered with a piece of felt or some other suitable fabric to prevent the metal from marring the desk top.

DESIGN A (MATERIAL FOR ONE)

No. of Pieces	*Material*	*Size*
2	Sheet tin	5¼ x 9¼ in.
3	Sheet tin	¾ x 2½ if design is to be appliqued
1	Chair glider	⅝ in.
1	Felt	3 x 5 in.
	Solder, flux, steel wool, glue, or cement for holding felts	

Tools: Alcohol burner, asbestos sheet, brush, carbon paper, copper plating set-up, emery cloth, file, flatiron, heating device, jeweler's frame and blade, lead or wood block, peening hammer, pencil, rule, scriber, soldering copper, tempera water color paint (yellow), tin snips, and weight.

Procedure:

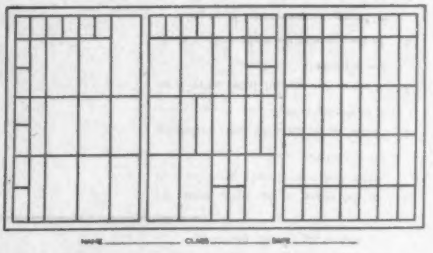
1. Use design shown in the illustration, or develop an original one.
2. Cut out tin stock; 2 pieces for each book end.
3. Solder one side of each piece.
4. Sweat both pieces together with hot flatiron. Weight the soldered parts together immediately as more is sweated.
5. Apply coat of yellow tempera water paint to one side of sweated piece for design transfer.
6. Lay design sheet and carbon paper over painted portion and trace design.
7. Cut out book end with tin snips.
8. File and dress edges with emery cloth.
9. Drill hole and pierce if design calls for it.
10. Peen exposed surfaces on lead or wood block.
11. Remove prongs from chair gliders, file edges.
12. Apply solder on edge of gliders.
13. Sweat-solder gliders in place with alcohol torch.
14. Cut and sweat-solder ornamental pieces in place.
15. Bend book end as shown.
16. Rub book end and other parts with steel wool and prepare for plating.
17. Apply thick plating of copper.
18. Polish project with steel wool. Use cloth to prevent touching metal with hands.
19. Apply coat of clear metal lacquer and allow to dry.

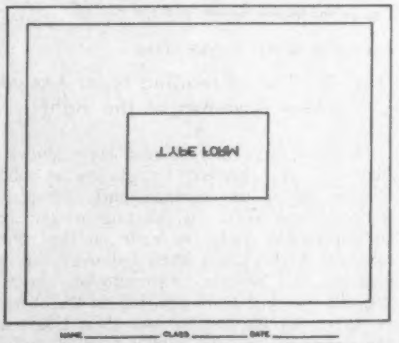
TEACHING AIDS FOR JUNIOR HIGH SCHOOL PRINTING

TOM WEIR AND ROBERT SMITH

Formerly Students, Division of Industrial Education
Santa Barbara State College
Santa Barbara, Calif.

An ancient bit of Chinese philosophy holds that one picture is worth a thousand words. This has been confirmed by recent scientific experiments which lead to the conclusion that 80 per cent of learning takes place through the sense of sight.





Above—Fig. 1. California job case
Below—Fig. 2. Chase with type form

Today teachers of industrial arts are discovering more and more the value of visual aids as a vehicle of learning.

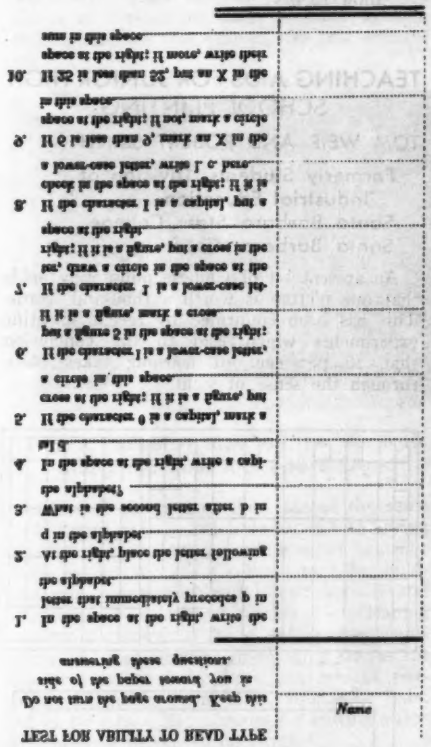
The division of industrial education of Santa Barbara State College, Santa Barbara, Calif., has developed many teaching aids which have been applied with considerable success in the printing classes in junior high schools.

The following aids serve to indicate the type of material which can be produced without elaborate equipment. All of them are inexpensive and have proved themselves very valuable.

The layout of a California job case shown in Figure 1, and the chase with the form in it, Figure 2, were drawn on offset plates and run on a Multigraph duplicator. This is a very convenient method of reproducing material where art work would otherwise be prohibitive.

After studying the case, each student is given one of the layouts and he is required to fill it in.

The blank of the chase is used in connection with a study of methods of lockup. Each student is required to draw in furniture, quoins, and reglets and have his work approved before locking up his first job. These sheets are then kept in the student's notebook.



TEST FOR ABILITY TO READ TYPE

Name

Do not mark the hole opposite. Each item is to be worth one point. Use pencil.

1. In the space at the right, write the letter that immediately precedes p in the alphabet

2. In the space at the right, write the letter following p in the alphabet

3. What is the second letter after d in the alphabet?

4. In the space at the right, write a capital L

5. If the character I is a lower-case letter, then a circle in the space at the right; if it is a gerund, put a cross in the space at the right

6. If the character I is a lower-case letter, has a figure 2 in the space at the right; if it is a gerund, mark a cross

7. If the character I is a lower-case letter, mark a cross in the space at the right; if it is a gerund, put a circle in the space at the right

8. If the character I is a capital, put a check in the space at the right; if it is a lower-case letter, write L. C. here

9. If 9 is less than 6, mark an X in the space at the right; if not, mark a circle in the space at the right

10. If 32 is less than 25, put an X in the space at the right; if more, write that in the space at the right

Fig. 3. Test in reading type. Answer sheet is shown at the right

The test for ability to read type, shown in Figure 3, was printed by placing a rubber blanket under the tympan and cutting the tympan away from the printing area so that an impression could be made on the rubber blanket. A sheet was then fed over this impression and covered with another sheet to prevent the type from printing on the sheet to be used. An impression was then taken and the impression on the rubber blanket "offset" to read like type.

An answer sheet was made to go with this test so that the same test sheets could be used over and over.

Fig. 4. Enlarged section of half tone.

Fig. 5. Original half tone

The test has proved satisfactory in the classes where it was used.

The half-tone visual aid, Figure 4, was made by photographing a small section of the half-tone cut shown in Figure 5. A 3-in. lens was used which magnified the object on the negative to double size. This negative in turn was enlarged to 8 by 10 in. Used with the original copy it gives vital proof to the students of the presence and arrangement of dots in a half tone, illustrating also the purpose of the screen in half-tone reproductions.

The bane of most beginning students in printing is the "demon" letters. The chart in Figure 6 was designed to show the appearance of these letters before and after they are printed. The top row of letters was printed by offset from the tympan.

Directions for making a platen press ready, Figure 7, were printed on tympan paper and posted back of each press. Gauge pins were shown at different stages in setting and one

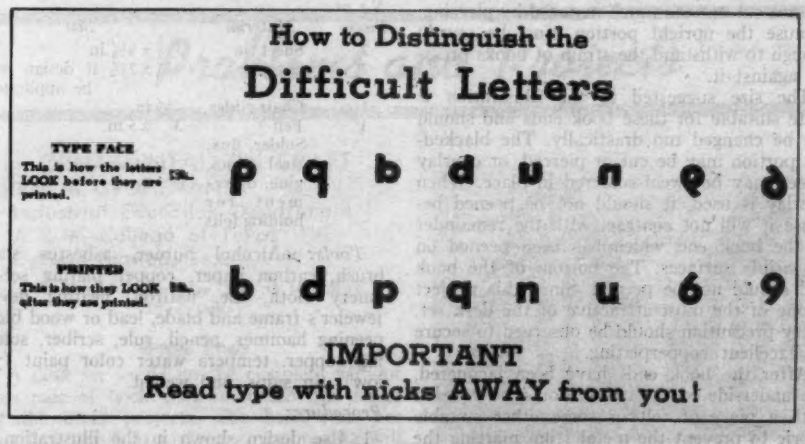

How to Distinguish the
Difficult Letters
TYPE FACE
This is how the letters LOOK before they are printed.
p q b d u n e ɐ
PRINTED
This is how they LOOK after they are printed.
b d p q n u 6 9
IMPORTANT
Read type with nicks AWAY from you!

Fig. 6. The difficult letters

pin was shown set and sealed. These directions and the sample job shown with the directions have been found to be very helpful to beginning students.

Directions for Making Press Ready

1. Dust press, especially disk and rollers.
2. Ink press.
3. Put in chase.
4. See that grippers clear type form.
5. Remove gauge pins from previous job.
6. Remove packing. (Replace tympan if necessary.)
7. Pull impression on tympan. Put in packing if necessary.
8. Set gauge pins.
9. Set counter.
10. Save O.K.'d sheet for color.

Directions for Setting Pins

1. Estimate position of paper and mark feeding line.
2. Insert prong of pin one eighth of an inch behind line through tympan sheet. Push halfway in and bring point up through tympan.
3. Adjust for position by moving pin down to increase top margin and up to decrease margin.
4. After obtaining correct register, press or tap teeth down. Seal with wax if necessary.

Fig. 7. A sample poster

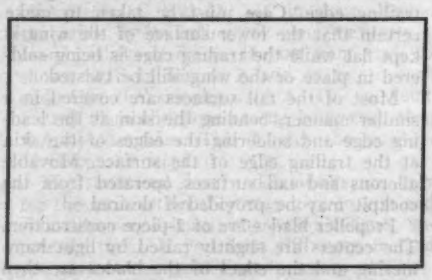
To simplify the teaching procedure necessary in a project involving name cards or business cards the layout, Figure 8, was designed. Each step in the procedure is described in sufficient detail to enable the student to proceed without too much aid from the instructor. Space is reserved on the chart for the placing of finished samples.

The project cards, like the one shown in Figure 9, were made up to give the student as wide a range of experiences as possible. It was felt that by having more projects and less copy in each project a larger area could be covered.

Name Card Layout

A layout is the printer's working plan for a piece of printed matter. The layout is to the printer what the blueprint is to the architect. On it detailed instruction is given to the compositor — the size of the job, size of type, caps or lower case, and width of lines.

Specifications: Size of stock, 2 by 3½ in. Width of line, 15 picas.



1. Draw on the layout sheet the size of paper on which the job is to be printed. Use a line gauge and draw the lines neatly and accurately.
2. Draw a horizontal line through the center of the layout.
3. Print your name by hand on this line. Do this neatly, making your letters as near like the style of type to be used as possible.
4. Indicate, to one side, the size and kind of type, and the width of the line.

Fig. 8. Directions for making a layout for a name card

Project No. 3

Introduction:

In order to set a simple paragraph, one must set each line the full measure — flush left and flush right. In few instances does a line exactly fill the measure. Usually one has to increase or decrease the space between words to justify a line in the stick. Oftentimes one has to divide a word at the end of a line in setting a paragraph.

Directions:

1. Set your stick for 13 picas.
2. Put a 6-point slug at the head and foot of your stick.
3. Put 2-point leads between lines of the paragraph.
4. Indent the first line of the paragraph one em quad.
5. Check your lines for errors before justifying them.
6. Proof, correct, get O.K., paste in notebook, and distribute type as in Projects 1 and 2.

Copy:

Printing is one of the greatest industries in the world, and it offers many opportunities to the ambitious and industrious boy who is interested and able to profit from the instruction.

Questions:

(Answer these questions in your notebook.)

1. Why do we indent the first line of a paragraph?
2. What is a ligature?
3. Why are ligatures used?
4. Why do we have nicks on type?
5. What classification of type is identified by having serifs?
6. Why are the thinnest spaces put closest to the type, and quads at the end of a line when quadding out a line?

Fig. 9. Sample of Project Card

As little reading matter as possible was included on the cards and supplementary material was presented in class discussions.

The cards were made to hang on a board accessible to the students, who were encouraged to complete as many of the projects as possible. Questions at the end of each project are answered in the student's notebook. The complete series consists of 12 projects.

The foregoing teaching aids are but a few of the possibilities that exist in the field of printing. Photography plays an important part in graphically presenting related material. Enlargements have been made of magazine illustrations and used successfully. Pictures and examples of books in the various stages of binding are also useful teaching aids. Progressive steps from layout to printed piece have been mounted on posters to show the cutting of a linoleum block. A lower-case "b" made of wood with a sliding stem was developed to help the student understand the relation of the type character to the printed character of the "demons." In one position the "p" and "b" are illustrated. Inverting illustrates "q" and "d." Aids of this nature have all been made and were found in many cases to enable the students to better understand the information being presented.

A JIG FOR LAYING OUT CHIP CARVING

ARTHUR W. TRUELL
School No. 50
Buffalo, N. Y.

It is usually a tedious job laying out chip carving designs. The jig shown in Figure 1 will make that task much easier. The dimensions will vary according to the type of work that is to be done. The one constructed by the author is for laying out ½-in. squares.

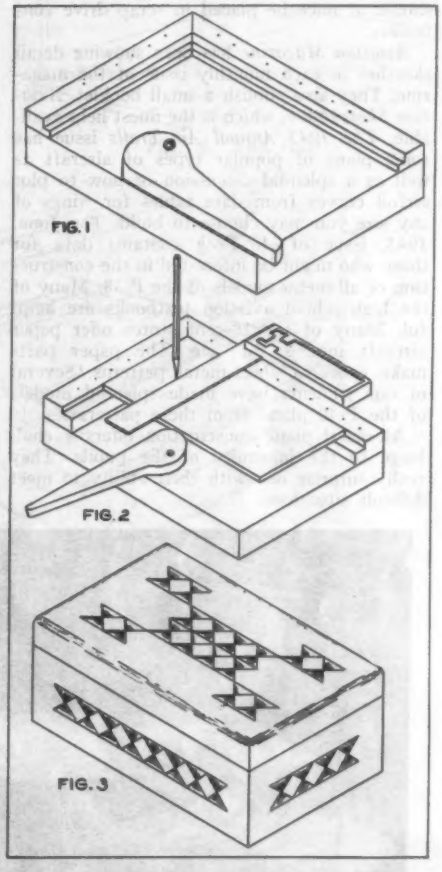


Fig. 1. Jig for laying out chip carving
Fig. 2. Method of using the jig
Fig. 3. The chip carving applied

The blank piece of wood is placed into the two-sided frame and the eccentric arm is turned until the piece is held tight. Then with a try square placed on the various marks, lines are drawn across the work. It is advisable to use brads to mark the divisions on the jig.

Figure 2 shows how the jig is constructed and used, and Figure 3 shows a typical chip carving project.

ALL-METAL AIRCRAFT CONSTRUCTION

ROGER J. WEAVER
Plainfield, Ind.

Almost every boy is interested in aviation and in learning how all-metal planes are constructed, and adding some information about this subject to your course will arouse much interest and enthusiasm.

Some might offer the objection that they know nothing at all regarding all-metal plane construction, but literature can now be obtained describing and showing by photographs and detail sketches how the parts of modern all-metal planes are made. The use of sheet metal during these times of scarcity might also be objected to, yet it is possible to secure most of the necessary material from discarded No. 10 tin cans obtained from the school cafeteria. Tops and bottoms of these cans should be removed and the body of the can cut open along the seam. The body is then rolled flat and all scrap that may be left should at once be placed in scrap drive containers.

Aviation Magazine has been showing detail sketches in each monthly issue of the magazine. They also publish a small booklet, *Aviation Sketchbook*, which is the finest help available. *The 1943 Annual Air Trails* issue has some plans of popular types of aircraft as well as a splendid discussion of how to plot airfoil curves from data tables for wings of any size you may choose to build. The June, 1943, issue of *Air-Tech* contains data for those who might be interested in the construction of all-metal models of the P-38. Many of the high school aviation textbooks are helpful. Many of the 10-cent stores offer paper aircraft models for sale. The paper parts make excellent sheet-metal patterns. Several of our students have made splendid models of the P-40 plane from these patterns.

All-metal plane construction offers a challenge to the ingenuity of the pupils. They really surprise one with their ability to meet difficult situations.

Models of different types of sheet-metal aircraft

Pupils are led to study aviation literature and textbooks and become acquainted with the terminology and develop an aeronautical vocabulary without being conscious of doing it. They also learn something about the work of the aeronautical engineer. The work should be assigned to groups of students to draw up the patterns and assemble a model of some plane. Larger models are better for group activity. Leadership and a spirit of cooperation quickly develop under such a plan. Experience in enlarging of plans, making layouts, soldering, cutting accurately, fitting, hand forming, and the use of body solder are all highly valuable.

The construction of model wing spars and sections of various types of wings, and the making of torsional tests of wings, and the loading of wing ribs to determine the amount of load required to cause them to fail, constructing a wind tunnel, making models of various types of wing flaps, empennages, and original designs of planes, all are worthy projects not only for the metal-shop classes but also to aviation classes within the school.

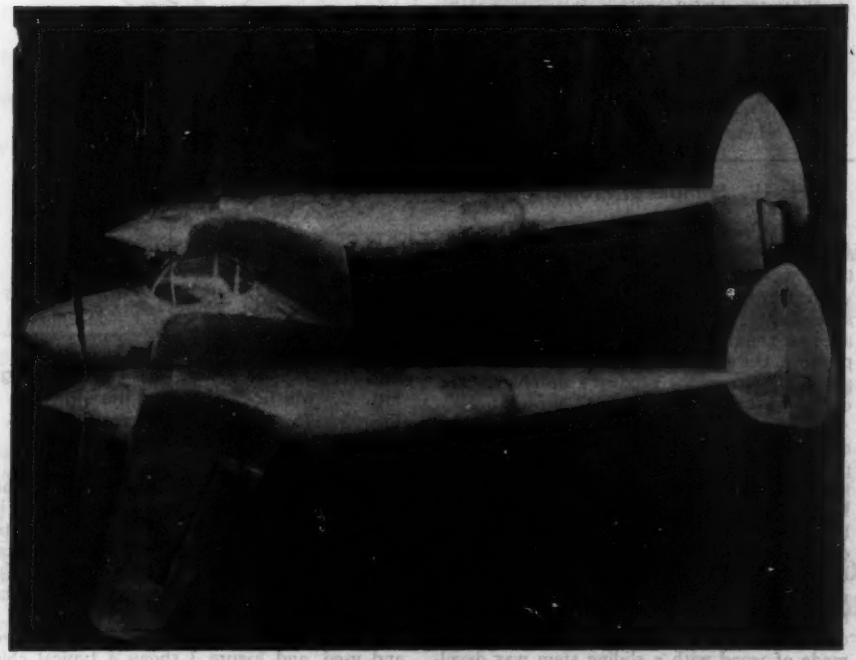
The writer began this type of work with a desire to have his classes build a model of a P-38. No plans were available, although he had five magazine illustrations showing the plane. All of these illustrations showed the plane at such an angle that no true length lines were shown. Using a pair of dividers and measuring the width of the pilot's forehead in one picture gave a unit of measurement from which it was possible to arrive at approximately the proper dimensions for a scale model.

The wing model constructed by the class was complete to wing spars and ribs with skin covering the upper part. Z bars were omitted because of the difficulty of fastening the skin in place when Z bars are used. The model was a group activity. The ribs were designed by a girl student who plotted the airfoil curve from a data table.

British Spitfire wings are especially difficult because of the curved leading edge. We found it best to construct the wing with top and bottom cover. The leading edges of both pieces were notched and soldered in place; then the edge contour was smoothed by the use of body solder. The other type wings were one-piece covers. The bottom cover is soldered fast to ribs and spars and then the top is drawn back over it and soldered along the trailing edge. Care must be taken to make certain that the lower surface of the wing is kept flat while the trailing edge is being soldered in place or the wing will be twisted.

Most of the tail surfaces are covered in a similar manner, bending the skin at the leading edge and soldering the edges of the skin at the trailing edge of the surface. Movable ailerons and tail surfaces operated from the cockpit may be provided if desired.

Propeller blades are of 2-piece construction. The centers are slightly raised by light hammering and the edges of the blades are then soldered together.



Sheet-metal aircraft

LOG-CABIN WREN HOUSE

JOHN W. DEAN
Arlington Heights, Ill.

This project was developed as a way to make use of a large quantity of ⅛ by ½-in. strips of soft pine which was given to the school shop.

A book on birdhouses gave us the necessary dimensions for the inside of a wren house, i.e., approximately 16 sq. in. of floor space and an opening ⅞ in. in diameter, 3½ or 4 in.

Fig. 1. Log-cabin wren house

above the floor. We also found that birds prefer an unpainted interior and dull colors for the exterior.

We planned for a floor 3½ by 4½ in. inside. Adding ½ in. all around for the thickness of the "logs" would mean a floor board 4½ by 5½ in. To this length was added 1½ in. for the flagstone step, making the bottom 4½ by 7 in. This step will aid in nailing the house to any flat surface but the wrens may not care for it as a gathering place for visiting sparrows. It might well be made much smaller, and have a similar projection at the rear, for nailing purposes only. Remember — do not paint the floor inside.

The square sticks should all have the same thickness; the width is not so important. Two edges should be rounded off by planing them before cutting them to length. See at A, Figure 2.

If the floor is 4½ in. wide, cut the first crosspieces, C and D, 5½ in. long. Round the ends by whittling, or you may use a sanding disk or drum. If you want ends as shown at B in Figure 2, add ¼ in. to each end. Cut the sidepieces, A A, 4½ in. long. Fasten C to the floor at the back end, then A A at the sides. This locates the position of D on the front.

The simulated door and windows are only for the satisfaction they may give to you and your admiring friends; the wrens will not appreciate them. If you want still more realism you may cut or paint lines to represent crossbars for the windows and even insert a piece of celluloid over the lines. A thin piece of wood, with vertical divisions, might be inserted in the door space. This space should be 2 or 2½ in. wide. The windows should be 1½ in. wide. Use a bench hook and saw about halfway through on the rounded side, then cut out the waste wood with a pocket knife. Each succeeding cut should be located and marked carefully from the one already in place below it.

The longer sidepieces E will be 6½ in. long, i.e., 2 in. longer than the piece A below it. Nail them in place, keeping the flat side even on the inside. Continue fitting each place, and nailing, until the walls are 4 in. high.

Each gable is made of a single piece of wood and may be corrugated to imitate logs, or they may be left plain and the lines painted on. Figure 4 shows the roof construction: note that it is half pitch, i.e., a 90-deg. angle. Since the house is 4½ in. wide, the base of the gable triangle will be about the same length, or slightly less for a close fit, and the altitude just half as much. If you are making many of these houses as a shop project it would be well to prepare a long strip of wood for the gables. You may be able to find a piece of corrugated molding that will do, or you make one with a shaper or special plane. You might start the grooves with the circular saw and *roughhew the logs* with chisels or gouges.

Bore a ⅞-in. hole near the bottom of the

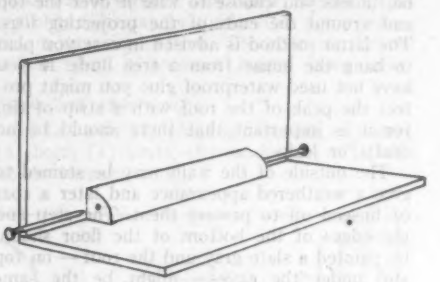


Fig. 4. The roof

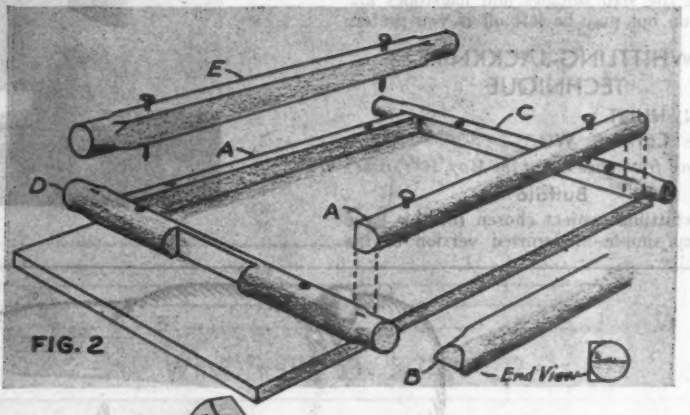


FIG. 2

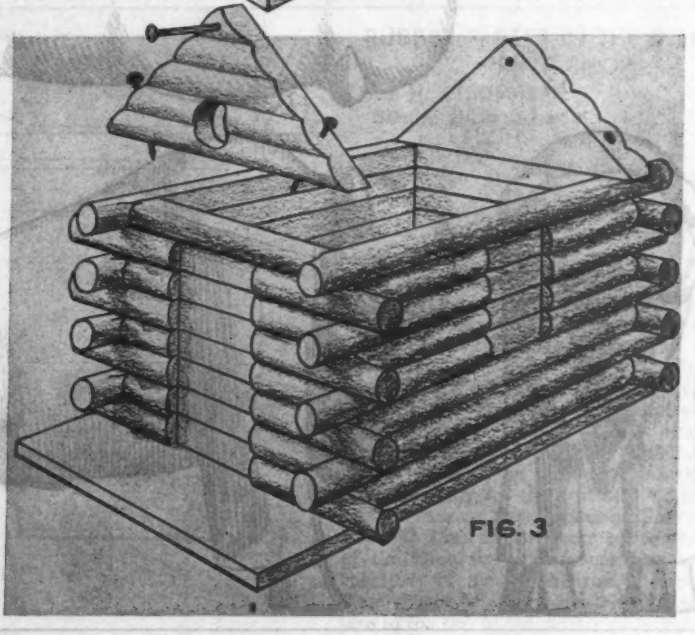


FIG. 3

Figs. 2 and 3. Details of instruction

front gable only; nail and glue both gables in place as shown in Figure 3. The roof is made of two pieces of board with eaves as wide as you wish. The boards for the top will probably be 7 in. long and 5 in. wide, though one will be as much narrower as the thickness of the other. Nail and glue them together as securely as possible and reinforce the joint with a piece of heavy quarter-round molding just as long as the distance between gables, approximately 4½ in. Drill holes through the peak of each gable to receive long slender nails so they will hold securely in each end of the quarter round. Drive in the nails but leave them projecting enough so they can be pulled out easily to remove the roof and clean out the old nest. This is all that holds the roof on, unless you choose to wire it over the top and around the ends of the projecting logs. The latter method is advised in case you plan to hang the house from a tree limb. If you have not used waterproof glue you might protect the peak of the roof with a strip of tin, for it is important that there should be no drafts or leaks.

The outside of the walls may be stained to give a weathered appearance and later a coat of linseed oil to protect them. The step and the edges of the bottom of the floor should be painted a slate gray and the roof — on top and under the eaves — might be the same color, or dark green or brown. The lines representing the slab shingles and flagstones are painted on but may be left off if you prefer.

WHITTLING-JACKKNIFE TECHNIQUE

W. BEN. HUNT
Hales Corners, Wis.

(Continued from page 213 of the May, 1944, issue)

Buffalo

The whittling project chosen for this issue is a very simple modernized version of the American buffalo. The one shown in Figures 147 and 148 was whittled out of mahogany. Other kinds of wood, such as walnut or pine, could be used and the results would be equally good. Mahogany, however, while it is classed as a hardwood, in reality is as easy to whittle as pine. Probably the only trouble with it is that to finish it smoothly, wood filler must be used.

Throughout this series of whittling projects, the crooked knife has been mentioned repeatedly. Such a knife assists the whittler to rough out an article in half the time, and with half the effort required when the work is done with an ordinary pocketknife. After the rough work has been done, a pocketknife is used to finish up the job. On some of the jobs, even the finishing may be done by making small cuts with a razor-sharp crooked knife.

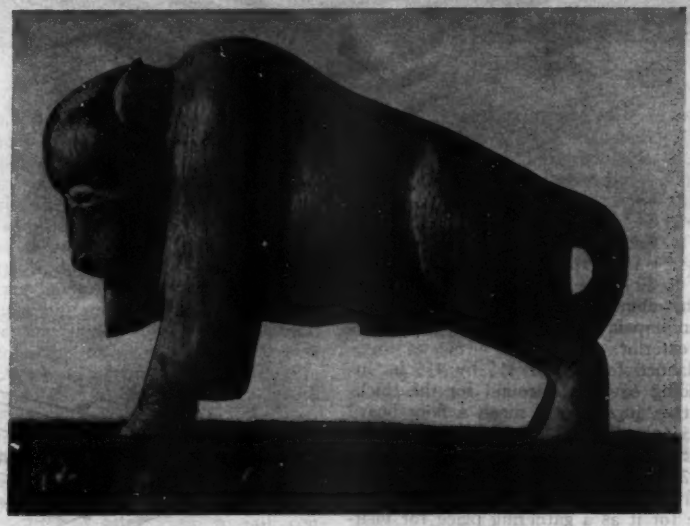


Fig. 147. The buffalo

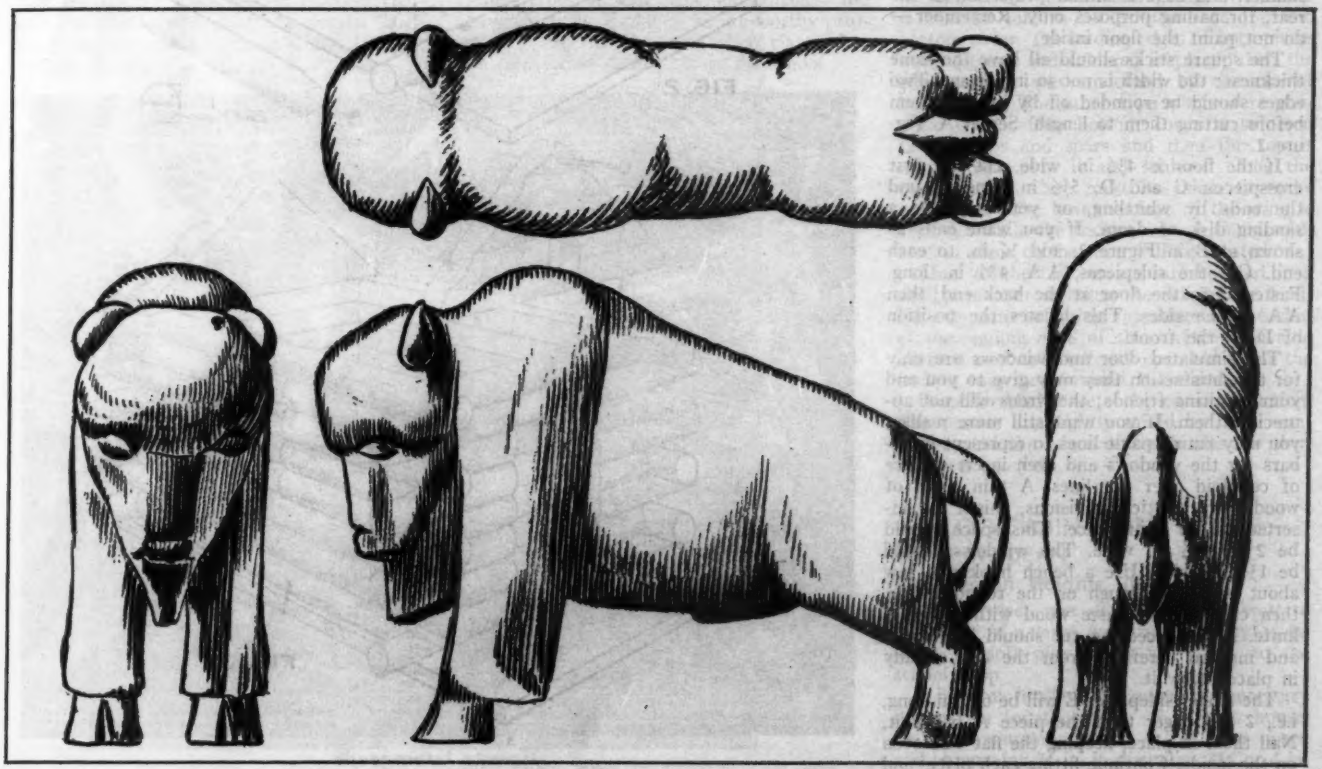


Fig. 148. Full-size pattern of buffalo

CROSS-LAP WINDMILL

JOHN W. DEAN
Arlington Heights, Ill.

Do you still teach your shop students to make practice joints before they make projects requiring them? If so, here is a suggestion of a way to utilize the original cross-lap joints that should prove popular.

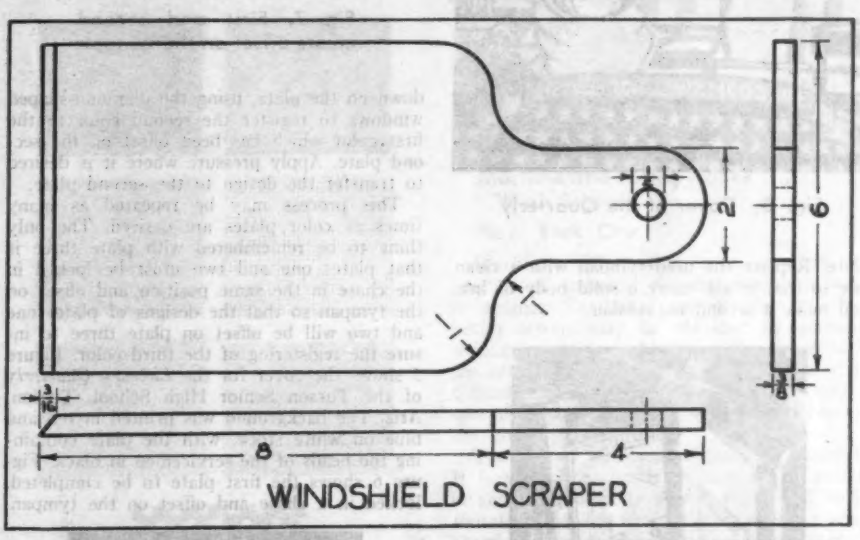
We will assume that you have used two pieces of ¾-in. wood, 1 to 1½ in. wide and 8 or 10 in. long. The cross-lap joint has been made exactly in the middle of each piece so

Fig. 1. Cross-lap windmill

that the center, for the hole, may be located easily by means of diagonals. Separate the two pieces and mark each as shown in Figure 2. Of course, the second piece will have the middle cut out on the opposite side. Cut away the portions marked X and sand the surfaces smooth. Ordinarily the cutting will be done with a knife but a saw and chisel may also be used. For quantity production a jig may be constructed to aid in sawing the pieces at the right angle on the band saw. If you have bored the hole through the center you may test each piece for balance and test the assembled wheel by spinning it. Remember that it will require less wind to start a well-balanced wheel revolving. A long slender box nail should be used for the pivot with small washers on both sides of the wheel to save wear. Probably you will want to oil or paint all parts before assembling them.

The vane may be a thin board of almost any suitable size and shape. Mount it on a ¾ by ¾ by 15-in. strip on one side, using a half-lap joint, or in a slot cut along the middle of the strip. Nail or glue the vane to the strip and mount the wheel on the other end. Test the assembly for balance and locate the hole for the pivot. Test your nail and drill on a piece of scrap wood for a close fit before boring through the strip. Use washers above and below the lubricating oil to decrease friction and prevent the penetration of water.

This sort of weather vane would be very similar to some of the whirligigs your father and grandfather made of soft pine to demonstrate their skill in whittling. We may modernize it by using two wheels as shown in Figure 2. This double feature will produce a novel effect whether both wheels revolve in the same direction at slightly different speeds or turn in opposite directions as indicated in Figure 2. Another variation may be accomplished by making the fans of the second wheel 2 in. longer than those of the first, as shown in Figure 1. A large glass bead or several small washers should be used to separate the wheels.



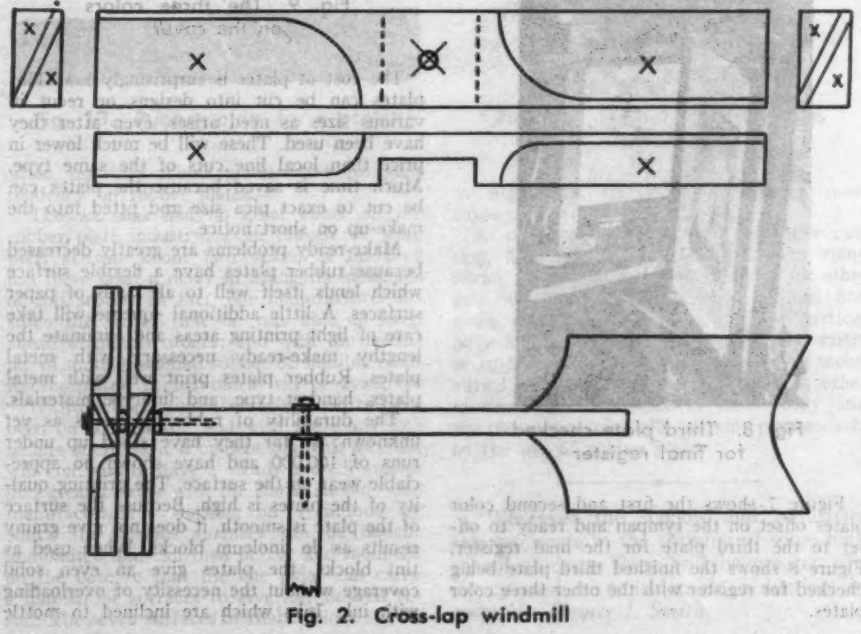


Fig. 2. Cross-lap windmill

AUTO WINDSHIELD SCRAPER

ISIDORE M. FENN
Chicago Vocational School
Chicago, Ill.

Auto drivers will welcome this windshield scraper. Frost, sleet, or a heavy coat of snow is very easily and quickly removed from the windshield without any damage to the glass. The use of this handy gadget, before starting the car, permits the ordinary windshield wipers to operate more freely and efficiently.

This easily made windshield scraper helps to give clear vision and fosters safe driving. Instructors find that students are anxious to make extra scrapers for their friends. This useful project can be made from scrap material in any size desired. The edge can be restored when it becomes ragged from wear.

Steps and experience:

1) Lay out, (2) plane and square, (3) saw, (4) bore, (5) bevel, (6) sandpaper, (7) shellac or varnish.

RUBBER PLATES IN THE SCHOOL PRINT SHOP

OTIS H. CHIDESTER
Senior High School
Tucson, Ariz.

(Continued from page 208 of the May, 1944, issue)

The Platen Press Method of Registering Color Plates

In the previous article information for the cutting of a plate to be used in a single color job was given.

There are two methods used to register plates for two or more colors. This one will deal with the platen press method. In schools where a precision proof press is not available the following method is used to insure perfect register. After the first plate has been cut, as described in the previous article, the cutter is ready for the next step. It is necessary to have as many plates as there will be colors in the run. All these plates should be of the same size; or if some are to cover only part of the over-all size of the design, these should be spaced out with metal furniture to the size of the master plate and placed in the desired position.

Now lock the first plate in a chase. Ink the press with a stiff-bodied ink that will cover a solid surface well. Build up the press with a hard packing until there is a sharp detail over the entire printing surface of the first

Fig. 5. Cover of the Quarterly

plate. Replace the used tympan with a clean one so that it will carry a solid body of ink, and make a second impression.

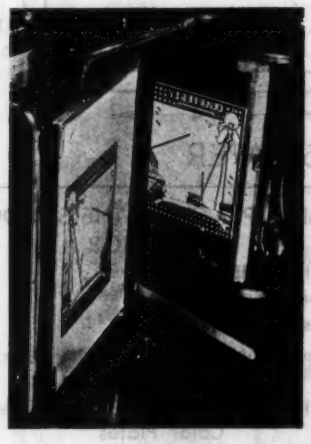


Fig. 6. First plate locked in chase

Remove chase and lock up the plate which will carry the second color without moving the left hand or bottom furniture. Now close press until the rollers just clear the bed of the press. Slip in the second form and pull an impression, thus allowing the ink on the tympan to be offset upon the second plate. Do not allow the rollers to roll over the surface of the plate, but remove the chase before the rollers drop to the form. This impression will have to be pulled by turning the flywheel by hand. Then spray the surface of the plate with the fixing solution so that it will dry more rapidly.

In making the original drawing, the desired colors should be used in their respective places by means of medium-soft colored lead pencils; now cut four small diamond-shaped windows in the design; place face

Fig. 7. First and second colors offset on the tympan

down on the plate, using the diamond-shaped windows to register the second color to the first color which has been offset on the second plate. Apply pressure where it is desired to transfer the design to the second plate.

This process may be repeated as many times as color plates are desired. The only thing to be remembered with plate three is that plates one and two must be locked in the chase in the same position and offset on the tympan so that the designs of plates one and two will be offset on plate three to insure the registering of the third color. Figure 5 shows the cover for the *Literary Quarterly* of the Tucson Senior High School, Tucson, Ariz. The background was printed in red and blue on white stock, with the plate containing the heads of the servicemen in black. Figure 6 shows the first plate to be completed, locked in a chase and offset on the tympan.

Fig. 8. Third plate checked for final register

Figure 7 shows the first and second color plates offset on the tympan and ready to offset to the third plate for the final register. Figure 8 shows the finished third plate being checked for register with the other three color plates.

The proper time to correct any imperfection in register by trimming up overlapping and ragged areas so that this error will not throw off the register of later plates is at each register step. Figure 9 shows the finished cover.

For schools which have a precision proof press there is available a much simpler method which does not tie up a platen press while the registering process is taking place. The same steps are used, except that the proof press is used.

Figure 10 shows a rubber block that was cut by the precision proof press method, and Figure 11 shows the desirable effect that can be obtained by combining rubber plates with photoengravings to accent certain desired parts of the photoengraving.

Figure 12 shows how a red and blue plate may be combined with a line cut to produce a beautiful cover. Process inks were used for the red and blue runs.

Figure 13 indicates one of the many school uses for which plates can be cut.

Various supply houses making rubber blocks have produced a number of surfaces. Figure 14 shows the six standard designs in addition to solid surface. There are a number of other features which make the use of rubber plate desirable.

Fig. 9. The three colors on the cover

The cost of plates is surprisingly low. Tint plates can be cut into designs or recut in various sizes as need arises, even after they have been used. These will be much lower in price than local line cuts of the same type. Much time is saved because the plates can be cut to exact pica size and fitted into the make-up on short notice.

Make-ready problems are greatly decreased because rubber plates have a flexible surface which lends itself well to all kinds of paper surfaces. A little additional squeeze will take care of light printing areas and eliminate the lengthy make-ready necessary with metal plates. Rubber plates print well with metal plates, handset type, and linotype materials.

The durability of rubber plates is as yet unknown; so far they have stood up under runs of 100,000 and have shown no appreciable wear on the surface. The printing quality of the plates is high. Because the surface of the plate is smooth, it does not give grainy results as do linoleum blocks. When used as tint blocks, the plates give an even solid coverage without the necessity of overloading with ink. Inks which are inclined to mottle

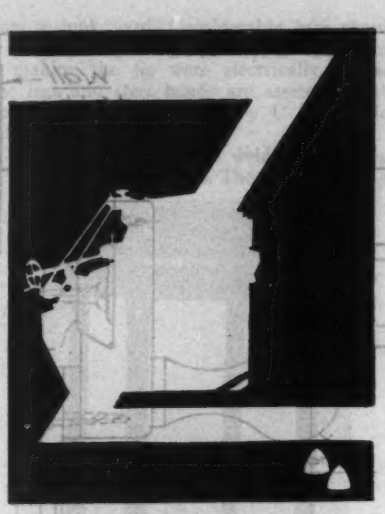


Fig. 10. Rubber block to be used with half tone

Fig. 11. The half tone printed over the rubber block

Fig. 12. Another Quarterly cover

Fig. 13. Rubber plate for a poster

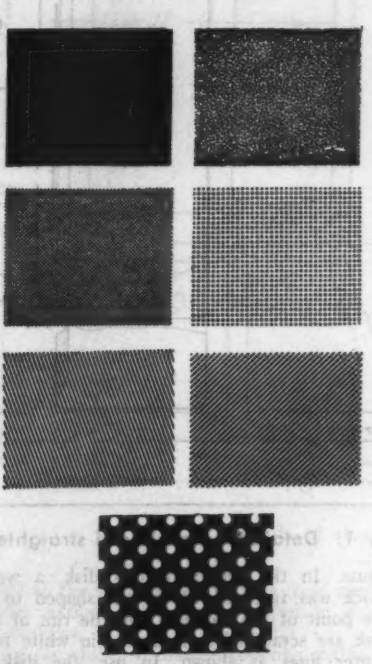


Fig. 14. Rubber-block surfaces available

when used on metal plates have no such tendency on rubber plates.

The war has had no great effect on the rubber plate industry; even though we have been at war about two years, at no time has there been a delay in filling the demands of this school. In fact, one manufacturer assures the writer that he was able to keep ahead of all his orders; and with the releasing of more reclaimed rubber of suitable quality for plates, rubber block will be available.

With the short time that rubber plates have been on the market, and with the many fine results obtained, it is evident that this medium will continue to have a steady growth and to find greater favor with the trade. Already one manufacturer is working on a method by which the various surfaces can be bought unmounted and can then be cut and mounted on the base so that the one plate can carry a number of surfaces to give any desired result. The seven surfaces of rubber block shown in Figure 14 are available through most dealers.

As one progresses in the art of plate cutting, he will discover that there are many tricks, short cuts, and tools designed for other jobs which fit his needs. Also he will find many tools used in silk-screen work particularly adaptable to plate cutting. The writer is sure that the ease of cutting, the many varied uses and combinations with other mediums, the low cost of make-ready and the pleasing results will sell him permanently on the use of rubber plates.

"Wherever the schools and industries can cooperate in the training of some high school students there will be greater efficiency and a considerable reduction in costs." — *Homer J. Smith.*

DEVICES USED FOR MAKING BLACKBOARD ILLUSTRATIONS

BENJAMIN J. STERN
Machine and Metal Trades High School
New York City

Blackboard illustration is an art that the teacher of technical drawing would do well to acquire. Textbooks are fine for drill but better results may be obtained by actually working out key problems on the board with the active aid of the students. However, it is difficult to achieve accurate results unless special devices, such as are described herein, are used.

The first of these is illustrated in Figure 1. It is a blackboard straightedge which assists in getting reasonably true vertical and horizontal lines at any desired point on the blackboard. It can also be used for setting angles. It consists of a dovetailed rail which is leveled and fastened to the upper wooden molding of the old-fashioned blackboard in my

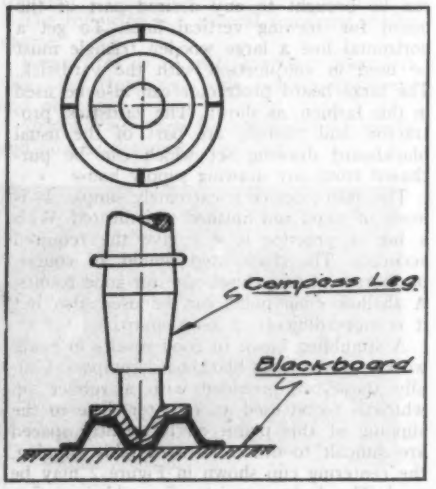


Fig. 2. Board compass center

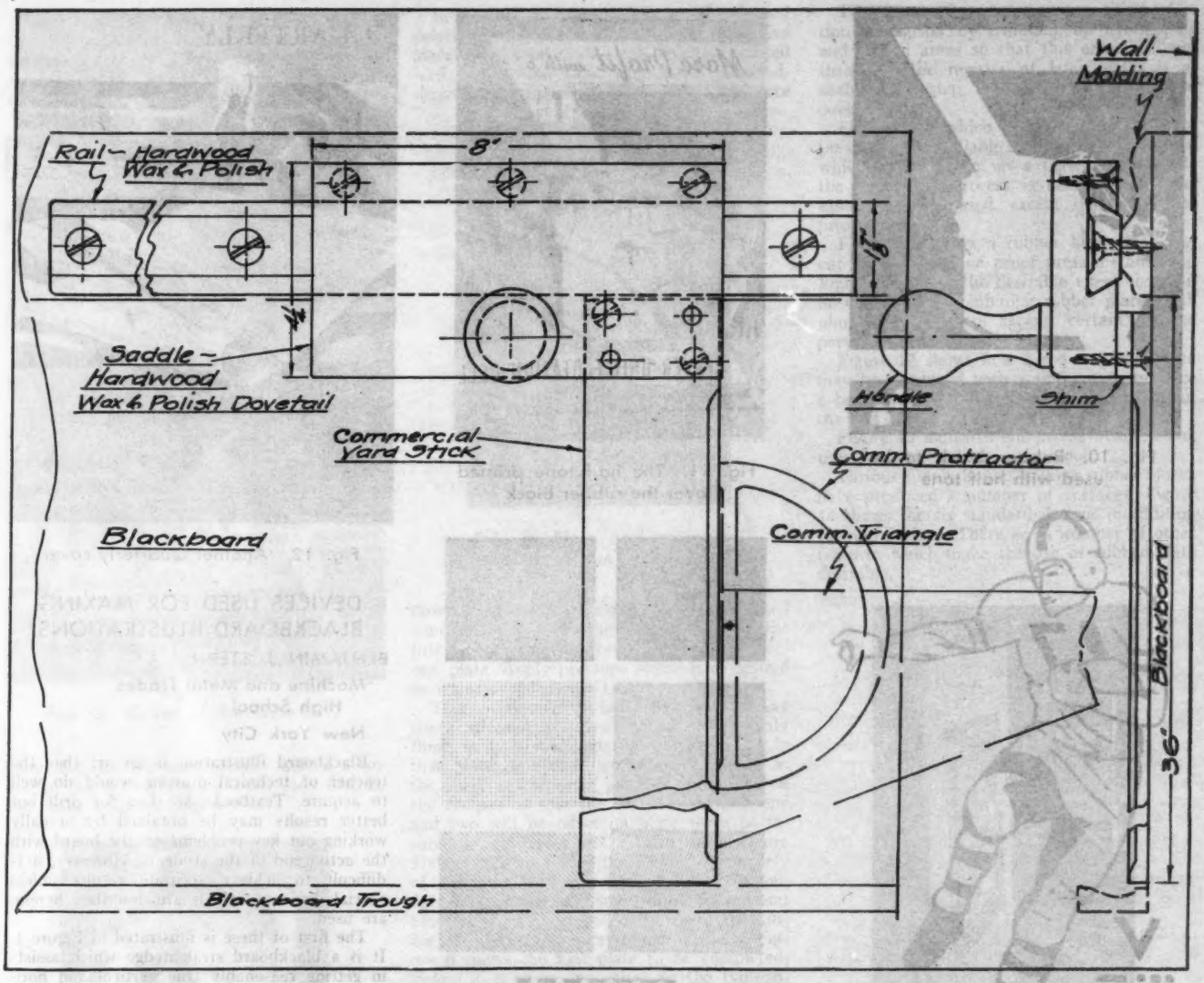


Fig. 1. Details of blackboard straightedge

classroom. On this rail slides a saddle to which is doweled and screwed a yardstick so set as to be perpendicular to the rail. By grasping the handle on the saddle the straightedge can be brought to any desired part of the board for drawing vertical lines. To get a horizontal line a large wooden triangle must be used in conjunction with the yardstick. The large board protractor can also be used in this fashion, as shown. The yardstick, protractor, and triangle are part of the usual blackboard drawing set which can be purchased from any drawing supply house.

The entire device is extremely simple. It is made of wood and finished as indicated. With a bit of practice it will give the required accuracy. The chalk used should, of course, be sharpened to a chisel edge for good results. A shallow cone point can be used also but it is more difficult to keep sharp.

A stumbling block to good results in chalk work is the average blackboard compass. Usually these are provided with a rubber tip which is to be used as a center. Due to the slipping of this point, circles rightly spaced are difficult to draw. To avoid this slipping, the centering cup shown in Figure 2 may be used. The device consists of a rubber suction disk purchased from an automobile supply house. In the center of this disk, a wood block was fastened which was shaped to fit the point of the compass. On the rim of the disk are scratched and painted in white four center lines as shown. In use, the disk is placed on the board to match the required center lines. Then by pressing it down, suction results, and grips the cup in place. The compass then has a secure center to work from, and reasonable accuracy can be secured by sharpening the chalk point cone shaped and keeping it sharp.

WELDED DRAWING STOOL

C. F. ZAENGLEIN
Circleville, Ohio

Our drafting room was badly in need of new drawing stools because the old ones had been in use for over 25 years and were worn out beyond repair.

This state of affairs inspired us to offer our advanced metalwork class a practical project in quantity production, which involved drafting, designing, building of jigs, bending, drilling, welding, filing, sawing, and finishing.

The class had a general discussion in regard to the design and construction of the stools. A working drawing was made by several of the students, while some constructed a welding jig, and others were assigned to draw up a bill of material for purchasing the material.

The legs were made of ¾-in. black iron gas pipe and were cut to exact length. All of the material which required bending was bent cold with the exception of the tops of the legs which were heated to a white heat with a gas torch and flattened out in a heavy vise and bent to a right angle as shown in the illustration.

The bottom of the legs were placed in a vise and bent to the desired shape by using a larger pipe as a lever. A template was made to insure proper uniformity in bending the legs. A slight chamfer was ground at the bottom of each leg to prevent marring the floor. The top band was made of 5/16 by 1½ by 42-in. mild steel, while the bottom one was made of 5/16 by 1 by 42-in. steel.

Before bending the bands to shape, a bevel should be ground on each end to prepare for a butt weld. A swage block was used for bending the top and bottom bands to a circular shape.

The welding jig was constructed from angle iron. We used old iron bed rails obtained

from a junk yard. Considerable care should be taken in squaring up the jig. The joints in making the jig were electrically welded. The legs and steel bands are assembled into the jig and held in place by C clamps for welding.

The top band should be welded to the legs on the inside of the band. The bottom band is

Welded drawing stool

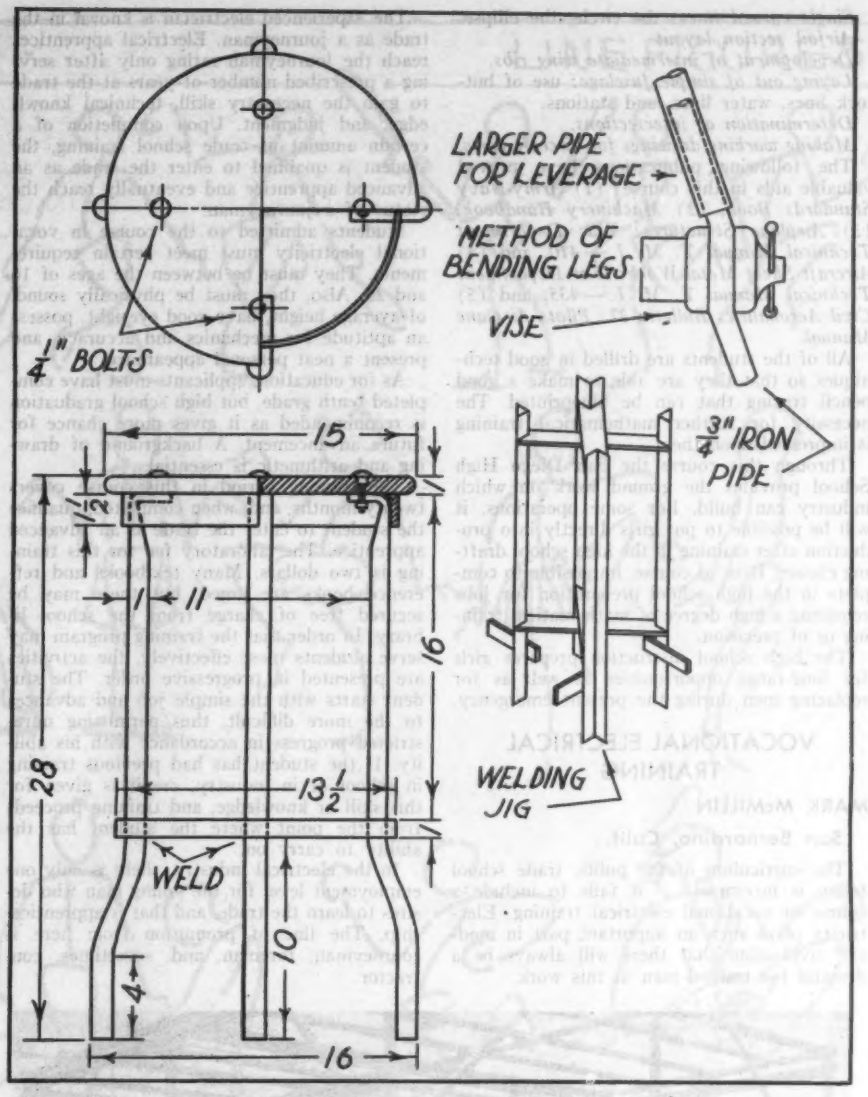
welded in the proper position and proper distance from floor by resting on the lugs as shown in the sketch of the jig.

Both electrical and gas welding was required of all the students in the class. The welded stool was then removed from the jig and prepared for the top. The top of the legs were center punched and a ¼ hole was drilled in each leg.

The top which was made of 1-in. oak and shaped as shown was then filled and finished before fastening to the stool.

After the stools were welded they were inspected for rough spots and filed smooth ready for enameling. The top was fastened to the stool with four ¼-in. carriage bolts.

Thirty-two stools were constructed at a cost of slightly over one dollar each.



Details of stool and welding jig

AIRCRAFT DRAFTING

PERCY H. HERON
Head, Technical Dept.
High School
San Diego, Calif.

San Diego High School is now preparing girls for direct entry into industry through shop-training courses and aircraft drafting. As men go to fight, women must go to work, not only in their traditional jobs, but also in many jobs new to women.

The purposes of the course in aircraft drafting are (1) to present in one semester, one hour a day, the general principles of orthographic projection as related to aircraft drafting and (2) through simple problems to introduce to the students the various tools used and the various processes employed in aircraft building.

Since the ability to handle common mathematical formulae is an important part of intelligent draftsmanship, problems are used involving the Pythagorean theorem, the use of natural trigonometric functions, and the laws of sines, cosines, and tangents.

In order to get started on his layout, the draftsman must have a working knowledge of certain parts of descriptive geometry but only those portions that have common application to aircraft structure are a part of the course.

The following is a general summary of the course:

Views used in aircraft drafting: rear, left side, plan, front, right side, bottom, auxiliary, and oblique.

Straight lines: how to determine true length and how to determine true angles.

Aircraft-drafting students

Single curved lines: the circle, the ellipse.

Airfoil section layout.

Development of intermediate wing ribs.

Laying out of simple fuselage: use of buttock lines, water lines, and stations.

Determination of intersections.

Making working drawings for aircraft parts.

The following publications have proved valuable aids in this course: (1) *Army-Navy Standards Book,* (2) *Machinery Handbook,* (3) *Airplane Structures: War Department Technical Manual T. M. 1.—410,* and (4) *Aircraft Sheet Metal Work: War Department Technical Manual T. M. 1.—435,* and (5) *Civil Aeronautics Bulletin 27: Pilots Airplane Manual.*

All of the students are drilled in good techniques so that they are able to make a good pencil tracing that can be blueprinted. The necessity for further mathematical training is impressed upon them.

Through this course the San Diego High School provides the ground work on which industry can build. For some operations, it will be possible to put girls directly into production after training in the high school drafting classes. It is, of course, impossible to complete in the high school preparation for jobs requiring a high degree of mathematical training or of precision.

The high school instruction prepares girls for long-range opportunities as well as for replacing men during the present emergency.

VOCATIONAL ELECTRICAL TRAINING

MARK McMILLIN

San Bernardino, Calif.

The curriculum of the public trade school today is incomplete if it fails to include a course in vocational electrical training. Electricity plays such an important part in modern civilization that there will always be a demand for trained men in this work.

The experienced electrician is known in the trade as a journeyman. Electrical apprentices reach the journeyman rating only after serving a prescribed number of years at the trade to gain the necessary skill, technical knowledge, and judgment. Upon completion of a certain amount of trade school training, the student is qualified to enter the trade as an advanced apprentice and eventually reach the status of a journeyman.

Students admitted to the course in vocational electricity must meet certain requirements. They must be between the ages of 16 and 22. Also, they must be physically sound, of average height, have good eyesight, possess an aptitude for mechanics and accuracy, and present a neat personal appearance.

As for education, applicants must have completed tenth grade, but high school graduation is recommended as it gives more chance for future advancement. A background of drawing and arithmetic is essential.

The training period in this course covers twenty months, and, when completed, qualifies the student to enter the trade as an advanced apprentice. The laboratory fee for this training is two dollars. Many textbooks and reference books are urged, but these may be secured free of charge from the school library. In order that the training program may serve students most effectively, the activities are presented in progressive order. The student starts with the simple job and advances to the more difficult, thus permitting unrestricted progress in accordance with his ability. If the student has had previous training in school or in industry, credit is given for this skill or knowledge, and training proceeds from the point where the student has the ability to carry on.

In the electrical industry, there is only one employment level for the young man who desires to learn the trade, and that is apprenticeship. The line of promotion from here is journeyman, foreman, and, sometimes, contractor.

The objectives of the course may be simply stated:

1. The ability to do definite jobs specified in the different employment levels.
2. The ability to understand the facts and principles that condition the job.
3. The ability to understand and appreciate the industrial relations that affect the job.

The electrical apprentice training program requires twenty months for completion, and is divided into the following:

1. House wiring.
2. Electrical construction and operation.
3. Motor and generator winding and repair.
4. Electrical appliance service and repair.

House Wiring (5 months)

Training in the ability to do such definite jobs as:

1. Read blueprints and specifications.
2. Design lighting and power layouts.
3. Install electrical services.
4. Install meter loops.
5. Install proper grounding.
6. Install lighting circuits.
7. Install appliance circuits.

Electrical Construction and Operation (5 months)

Training in the ability to do such definite jobs as:

1. Power switchboard design and construction.
2. Single-phase motor installation.
3. Two-phase motor installation.
4. Three-phase motor installation.
5. A.c. and d.c. generators.

Motor and Generator Winding and Repair (5 months)

Training in the ability to do such definite jobs as:

1. Motor and generator tests.
2. Redesign of wiring.
3. Rewind motors and generators.
4. Shaft and bearing maintenance.

Electrical Appliance Service and Repair (5 months)

Training in the ability to do such definite jobs as:

1. Testing and recognition of defective parts and improper adjustments.
2. Installing new parts and making proper adjustments on such equipment as vacuum cleaners, flatirons, toasters, waffle irons, percolators, washing machines, etc.

Students enrolled in vocational electricity in the Public Trade School, San Bernardino, Calif.

MAKING IMITATION MARBLE

ARNOLD RADTKE

Peckham Junior High School

Milwaukee, Wis.

Keene cement may be used to make many fine projects which may be made to look like marble, and which can be given a polish comparable to genuine marble. After a few trial projects the craftsman will be limited only by his own skill and ingenuity.

Keene cement is not a plaster but a real cement. It is made by calcining calcium sulphate (gypsum) at many hundred degrees above what is used for making plaster of Paris. This cooking drives off all the water of crystallization and leaves a material that has no affinity for water. A catalyzer of a coloidal nature is added to accelerate the setting time. Unlike plaster of Paris, Keene cement may be retempered after it has begun to set, as the setting takes place around and in the catalyzer.

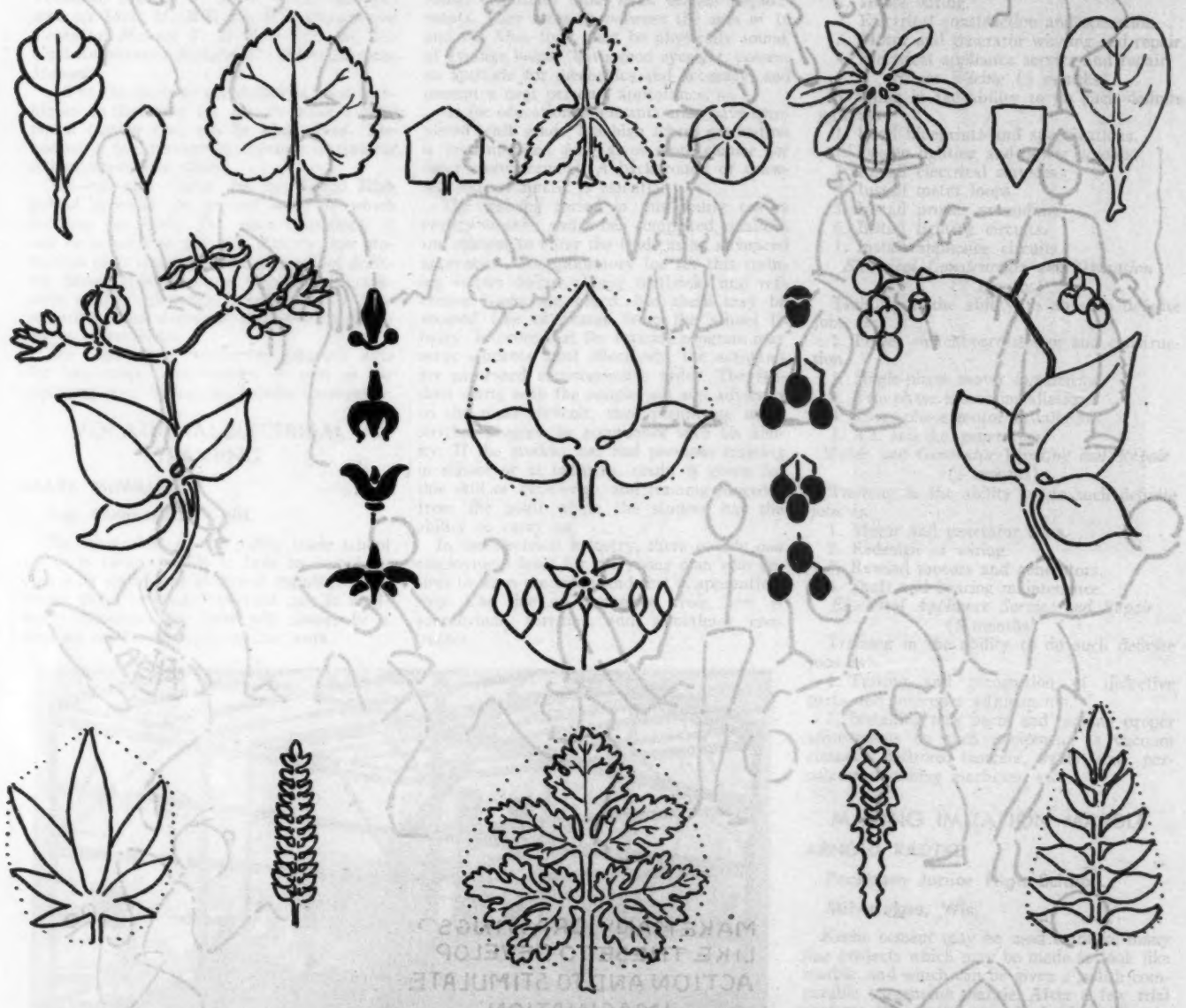
Colors to be used should be dry mineral colors. Dyes or vegetable colors should never

(Continued on page 253)

Plate 21. Creative design course by Richard E. Bailey, chairman, art department, Central High School, Providence, R. I.

PLATE 22 NATURE

ALL OF THE ELEMENTS OF DESIGN ARE FOUND IN THE BEAUTIFUL ORGANIZATION OF NATURE · STUDY THE STRUCTURAL BASE OF NATURES' FORMS, THE MOVEMENT OF GROWTH AND PATTERN, THE SPIRALS, RADIATION, AND BALANCE. THEN YOU WILL HAVE A RECORD OF THE BUILDING UP PROCESS TO USE IN CREATING ORIGINAL DESIGNS



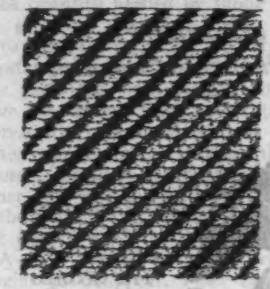
WE CAN ONLY HINT HERE AT THE GREAT VARIETY OF FORMS WHICH NATURE OFFERS · THE STUDENT MUST SEEK THESE OUT FOR HIMSELF —·

Plate 22. Continuation of creative design course by Richard E. Bailey, chairman, art department, Central High School, Providence, R. I.

HOW ARE TEXTILES DECORATED?

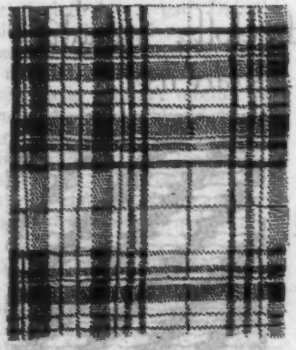
The most basic decorations are produced by variations in kind, texture, color, number, and arrangements of yarns and threads, as the cloth is woven.

A simple fabric may depend on texture for its decoration. This may be smooth or irregular.



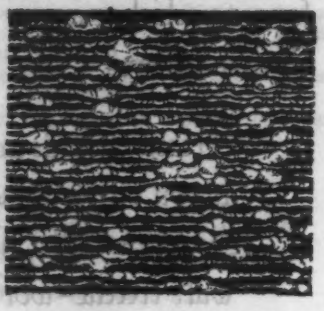
Common Twill

Simple weaves may be arranged to raise one color, then another, to the surface in some regular order.



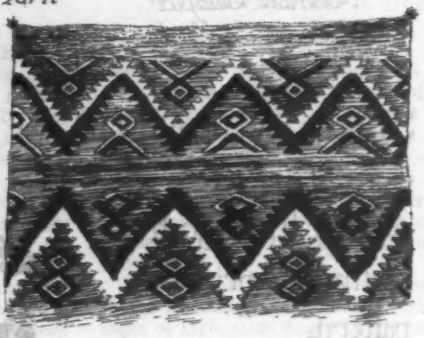
"Royal Stuart" Tartan

Color, introduced in warp and weft, produces tints and shades at intersections.



Cloth of Irregular Wool Yarn

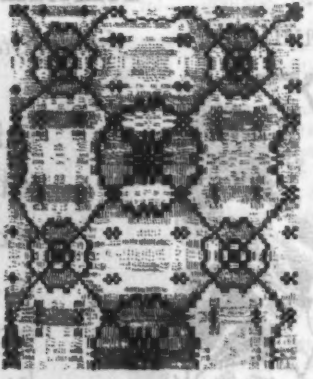
Decoration is woven into tapestry, and similar fabrics, by carrying yarns of various colors back and forth in certain areas.



Portion of Southwest Indian Blanket

Decoration may be produced, in addition to the methods described, by close or loose weaving, by leaving open areas, by pulling threads out of their usual rectangular order, or by a combination of two or more of these methods.

The designer who works in these forms must understand the techniques of weaving.



Variation of the "Lovers' Knot" Overshot Weave

Limitless variation may be produced by bringing warp or weft threads to the surface as "floats" over the body of the cloth.

Plate 38. Design course by Burl N. Osburn, director of industrial arts, State Teachers College, Millersville, Pa.

TEXTILE DECORATION (Continued)

American Sampler
Cross-Stitched

Colored threads are stitched to a base to form a partial or an all-over pattern.

Certain threads are drawn out, and the spaces partially filled with needle-work.

Cap of Charles V
Drawn and Embroidered

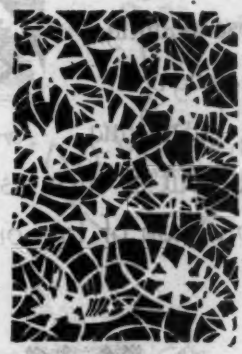
Stencils are cut and laid over cloth. Inks are brushed or scraped through the openings to print the pattern.

One of Four Units from "The Gossips" by the Folly Cove Designers, Gloucester

Block Print Luncheon Set

Figures are cut on blocks, which are coated with ink and pressed onto the cloth. Intaglio processes also are used.

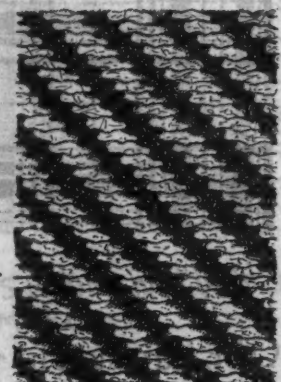
Pile fabrics may have certain areas clipped to a shorter length to produce a decoration.



Japanese Stencil

Cut Velvet
Victoria and Albert Museum

Pattern areas are coated with wax as a protection, and the cloth is dipped in dye to color remaining areas. This may be repeated on other portions in other colors.



Javanese Batik

Plate 39. Continuation of design course by Burl N. Osburn, director of industrial arts, State Teachers College, Millersville, Pa.

(Continued from page 248)

be used because dyes run when the cast is placed in water, and vegetable colors are too fat. Neither of the two are permanent.

Molds may be made of tin, cardboard, rubber, glue, paraffin, or wood. Molds should be greased or oiled before the cement is poured into them to prevent the cement from adhering to them. Only a thin film of oil should cover the inside of the mold. Wood molds are best where a number of subsequent casts are to be made. The author has used wood molds over and over for a period of five to six years. Tin will rust, and cardboard will do where only one cast is to be made. Molds should be true and accurate to avoid a lot of truing up after the cement has taken the shape of the mold.

Measure the quantity needed by filling the mold before greasing, then add about one fourth more to allow for shrinking. Add about one fourth water by volume and stir until a thick creamy paste has been formed. It is better to have the cement thick rather than too thin. Spread the colors thinly over the surface of this mixed cement. If more than one color is used, spread each separately, not over each other. Stir with a paddle or trowel, lifting from the bottom and folding over the top. Continue stirring until the desired effect is obtained. A good method is to stop when the white begins to disappear. Place in the center of the mold and allow it to spread to and up the sides to force out the air that would otherwise cause voids. Set aside to dry about 24 hours.

Remove the cast from the mold and if the topside is very rough it should be planed true. Sandpaper the sides and top and bottom with waterproof sandpaper, using plenty of water. Start with 4-0, 6-0, and then finish with 400A. Sandpaper until smooth. Fill any holes that may appear with cement of the same color as the cast piece. Sandpaper and fill as often as needed to make a smooth surface for final polishing. Set aside to dry for about a week.

Fold a piece of cloth into a pad. Dab this cloth into a little alcohol and rub over the cast piece. Place a small amount of linseed oil, boiled or raw, on the cloth, and gently rub over the surface in a rotary motion. Dip a corner of the cloth into oxide of tin and repeat the rotary motion until a good polish is obtained. Finish rubbing with the palm of the hand to produce a high gloss polish. If the oxide of tin is hard to obtain, a fairly good polish may be obtained by substituting shellac for it.

Tools may be kept clean and free of rust by wiping with a cloth dipped in a mixture of half kerosene and half machine oil. Never use water to clean either tools or bench tops. Besides rusting the tools it will always leave them and the bench top streaked and gray when dry.

Besides the regular woodworking tools found in most shops the only additional tools needed are a trowel and mixing pan. A wooden paddle or spoon may be substituted for the trowel.

By carefully following the directions many useful projects may be made, such as tiles, pen stands, ash trays, lamps, book ends, and vases. It is generally best to start with a simple project such as a tea tile.

Making a Round Tile

1. Cut a shallow dish from the bottom of a round cardboard box. An oatmeal box will do.
2. Draw a line ¾ in. up from the bottom all around the side.
3. Cut off along this line.
4. Grease or oil the inside of this dish.
5. Measure and mix the cement as directed.
6. Add the colors and stir.
7. Place the cement in center of mold, and allow it to spread until the mold is filled.
8. Set aside to dry for about 24 hours.
9. Remove the cast from the mold. If the paper does not come off easily, place the cast in water and the paper will come off readily.
10. Sandpaper and polish as directed.

Any other shape may be made in this same manner. Wood molds may be turned on a lathe for round tiles or built up for square tiles.

WHAT HAPPENS WHEN A LINOTYPE KEY IS PRESSED?

HAROLD R. JOHNSON

Washington Park High School

Racine, Wis.

Several of the functions of the linotype machine are very difficult for beginners to understand and are troublesome to explain. Working models, assembled principally from discarded parts, help students visualize what takes place behind the smooth, alluring click-click of the keys.

When a key on a linotype is pressed, 12 parts are set in motion before a matrix drops into the assembler. With the exception of the keyboard key lever, and possibly the key reed, none of these are visible to the operator. But unless a student is to be just a keyboard puncher, he should have a knowledge of how the machine works and an understanding of what goes on behind the scenes.

One of the most difficult and complicated parts of the linotype is the assembling mechanism. "What Happens When a Linotype Key Is Pressed" forms an interesting topic of study in linotype instruction and can be explained very well with a working model similar to the ones shown in Figure 1.

To make such a model, secure a mounting board about 16 by 32 in. Next get the following items: Keyboard key lever, keyboard key bar, trigger, cam assembled (in cam yoke), keyboard rod, escapement lever, escapement verge, escapement pawls (front and back), escapement verge spring, escapement verge plunger.

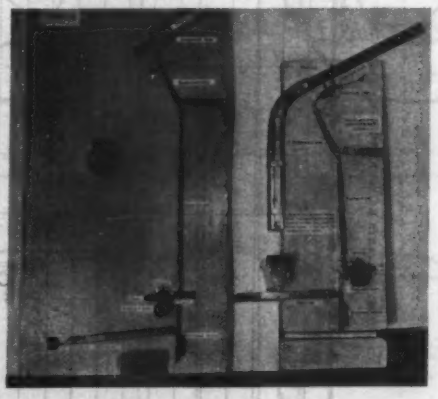


Fig. 1. "What happens when one linotype key is pressed" is graphically shown on these boards assembled from spare parts of a linotype. The board at the left is described in the accompanying article, and represents the action of one of the front cams. The board at the right illustrates the action of a rear cam

Fig. 2. Practice keyboard and linotype distributor bar, showing sustaining rails that hold teeth of matrices as they are moved along until they come to a point at which sustaining rails end and combination of teeth allow matrices to drop

A section of a keyboard roller will also be needed, a metal track to serve as a section of the magazine, a small metal cup, screws, and staples.

Beginning at the top, the metal track should be located on the board with the same angle of inclination found in the magazine as it rests on the linotype machine — 127½ deg. Openings must be made in the lower side of the runway to admit the pawls. Proceeding downward, the verge, pawls, verge spring, plunger, escapement lever, keyboard rod or reed, cam assembled, cam stop, keyboard roller, keyboard key bar, trigger, and keyboard key lever should be laid out on the board in exactly the same relative position and with the same clearance found on the linotype. After the position has been determined and marked accurately for each part, these are fastened, lightly at first, for a trial. If the positions need to be changed slightly, this can be done. When it is evident that the mechanism will work and the mats respond to a touch of the keyboard button, they may be removed and the board painted.

Then the final reassembling is done, and the metal cup located and fastened in a position to receive the mats as released from the magazine.

For a more realistic model a small motor may be mounted on the back of the board to drive the keyboard roller continuously as is the case on the linotype machine.

Labels attached to or near each of the parts teach the names quickly and cause students to refer to a part by its correct name.

Plans described herewith are for a model 8 or 14 linotype. Adaptations can be made for any model desired.

An old distributor bar, mounted on a stand, demonstrates easily how mats are dropped into their respective channels. Each of the characters in the 90 channels of the magazine have a different combination of teeth. As the mats are moved along the bar and reach the end of the rails sustaining them, they drop off and are guided into their respective channels. See Figure 2.

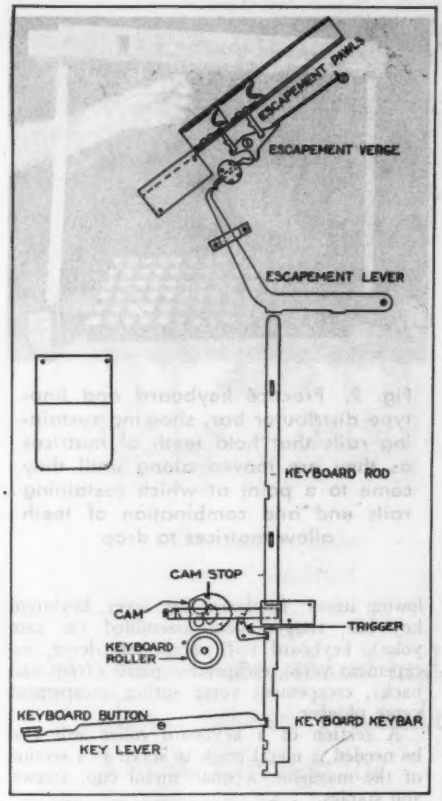


Fig. 3. Diagram of linotype mechanism

A practice keyboard, purchased from the Linotype Company, is helpful in teaching keyboard fingering.

Even though a school shop may not have a linotype, auxiliary model equipment, such as described, gives a clear understanding of this machine and adds materially to the interest in a printing course.

MIAMI TECHNICAL HIGH SCHOOL

J. I. SOWERS

Supervisor of Industrial Education

Miami, Fla.

In the boom years in Miami a building was planned and built to house what was to be known as the Roosevelt Hotel. The building is a 15-story structure with 2 stories additional in a penthouse on top. The hotel never opened; in fact, the building was never quite finished inside. Lots of work in the interior of the building yet remained to be done when the Dade County School officials acquired the building a little over five years ago.

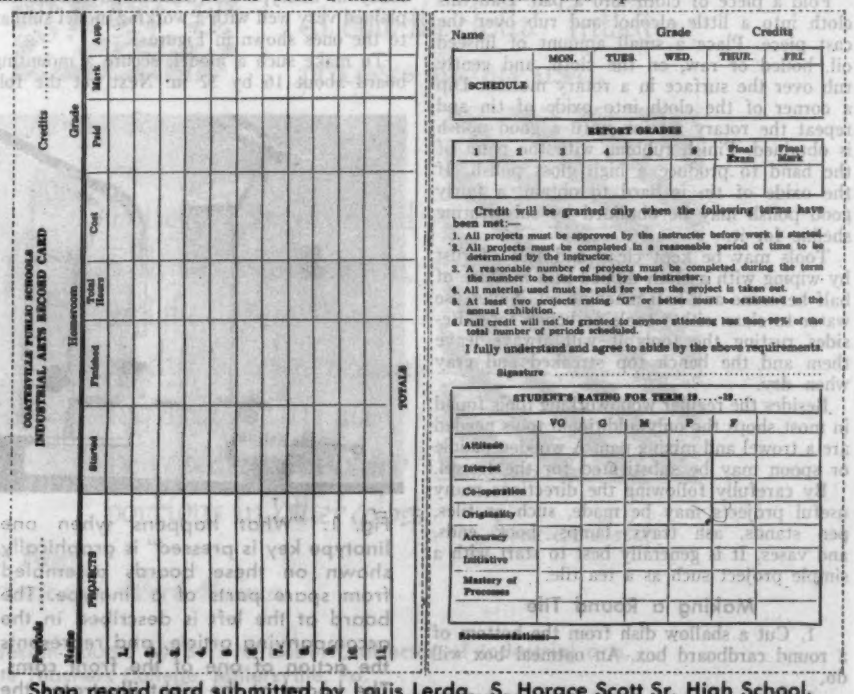
The building was formally opened in February of this year, though various departments of vocational work had been carried on there, as the various floors were ready for occupancy, since September of last year. Previous to occupying this building, a vocational school with a limited number of departments of work was opened in a former grade school building in October, 1937. This building is opposite the present 15-story school, and is now turned over to war work.

Not all the space in the building is devoted at present to the Technical High School.

Miami Technical High School

Some of the floors are turned over to war industries training, and the top floor is used for a servicemen's dormitory. Eventually the whole of this beautiful, well-appointed building will be occupied by a technical school, which will serve Miami and south Florida. It will be noted that this school has grown through a number of years into its present magnificent quarters. It has been a natural and healthy growth to meet community needs.

Courses offered at present are as follows: aircraft engines, aircraft mechanics, auto mechanics, bench metal and welding, cabinet and millwork, commercial art, commercial cooking, Diesel engines, drafting, electrical construction, motor winding, needle trades, printing, photography, radio communications, radio construction and repair.


COATESVILLE PUBLIC SCHOOLS
INDUSTRIAL ARTS RECORD CARD
Homeroom
Credits
Grade
Periods
Name
PROJECTS
Started
Finished
Cost
Total Hours
Paid
Mark
App.
TOTALS

Name Grade Credits

SCHEDULE	MON.	TUES.	WED.	THUR.	FRI.

REPORT GRADES

1	2	3	4	5	6	Final Exam	Final Mark

Credit will be granted only when the following terms have been met:—

1. All projects must be approved by the instructor before work is started.
2. All projects must be completed in a reasonable period of time to be determined by the instructor.
3. A reasonable number of projects must be completed during the term the number to be determined by the instructor.
4. All material used must be paid for when the project is taken out.
5. At least two projects rating "G" or better must be exhibited in the annual exhibition.
6. Full credit will not be granted to anyone attending less than 90% of the total number of periods scheduled.

I fully understand and agree to abide by the above requirements.

Signature .....

STUDENT'S RATING FOR TERM 19....-19....

	VG	G	M	P	F
Attitude					
Interest					
Co-operation					
Originality					
Accuracy					
Initiative					
Mastery of Processes					

Assessment Subject—

Shop record card submitted by Louis Lerda, S. Horace Scott Sr. High School, Coatesville, Pa.

The first work in a federally and state supported vocational program began in Miami in September, 1923. The early work consisted of a continuation school with evening, and part-time and rehabilitation classes, to which was later added a full- and part-time opportunity school. The first work in vocational education on a high school level were courses in power boatbuilding, architecture, and carpentry.

CABINET DRAWING

W. W. STURTEVANT

South High School

Minneapolis, Minn.

(*Continued from page 216, May, 1944 issue*)

Plate 5 is somewhat more difficult, but may be considered as a supplementary plate to be drawn by those pupils who have completed the other four plates.

If time does not allow for drawing the 16 blocks shown on plates 1, 2, 3, and 4, these may be combined and two exercises selected from each plate so that pupils have two plates showing 8 blocks, or pupils may save still more time by drawing one each of the four groups, drawing all on one sheet. The drill obtained by drawing all of the exercises will justify the time spent, however.

Plate 6 or some similar objects may be drawn next. The steps necessary to draw a cylinder are illustrated in Figure 10.

Draw a circle with center at A. Draw a line through A at 45 deg., and locate point B which will be the center of the circle showing the farther edge of the disk. The circles are of the same diameter. Draw tangent lines at a 45-deg. angle to show the sides of the disk.

These lines are frequently omitted by pupils when drawing thin disks, and it is well to show the necessity of drawing the 45-deg. tangent lines by showing how a longer cylinder would look.

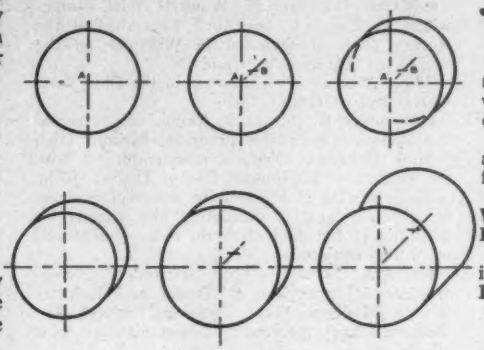


Fig. 10

(To be continued)

Beware of thinking all your own that you possess, and of living accordingly. It is a mistake that many people who have credit fall into. To prevent this, keep an exact account for some time, both of your expenses and your income. If you take the pains at first to mention particulars, it will have this good effect: you will discover how wonderfully small, trifling expenses mount up to large sums, and will discern what might have been, and may for the future be saved, without occasioning any great inconvenience. — *Franklin.*

Personal News

WISCONSIN'S NEW VOCATIONAL DIRECTOR

Lt. (jg) C. L. Greiber was chosen to succeed the late George P. Hambrecht as director of vocational and adult education of Wisconsin, on April 3, 1944.

Before the new director can assume his job as state director his release must be obtained from the U. S. Navy.

Greiber is a graduate of the University of Wisconsin and was acting director whenever Hambrecht was absent from Madison.

John Callahan, state superintendent of public instruction, will continue as acting director until Lt. Greiber is released for his new position.

VOCATIONAL EDUCATION LEADER DIES

John H. Trybom, director of vocational education for the Detroit public schools, retired since July 1, 1937, died at Phoenix, Ariz., April 28, 1944. At the time of his retirement, Mr. Trybom had become widely known for his program of vocational education which he had successfully installed in the Detroit public schools. Mr. Trybom was brought to Detroit to develop a program of vocational training that would be adaptable to the needs of a rapidly growing industrial city. Previous to his coming to Detroit he had won distinction at Boston as teacher and administrator of the manual training program.

Credited with organizing the entire vocational program of the Detroit public schools, he came to this city when the classical tradition was firmly entrenched in education. He himself had a background of classical education, having been graduated from Harvard University with the bachelor of arts degree in 1896. He later did graduate study, earning the masters of arts degree in Harvard graduate school. When he was appointed

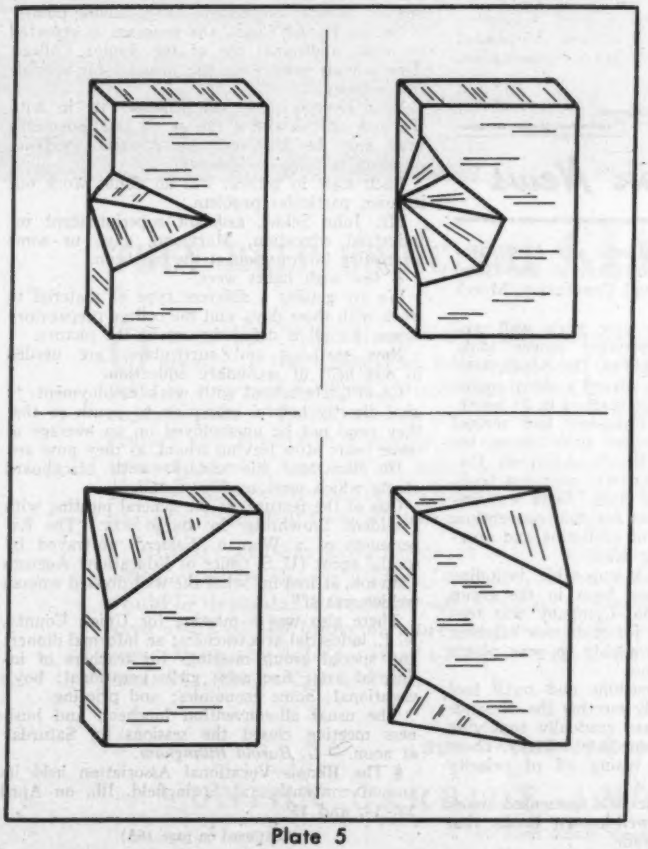


Plate 5

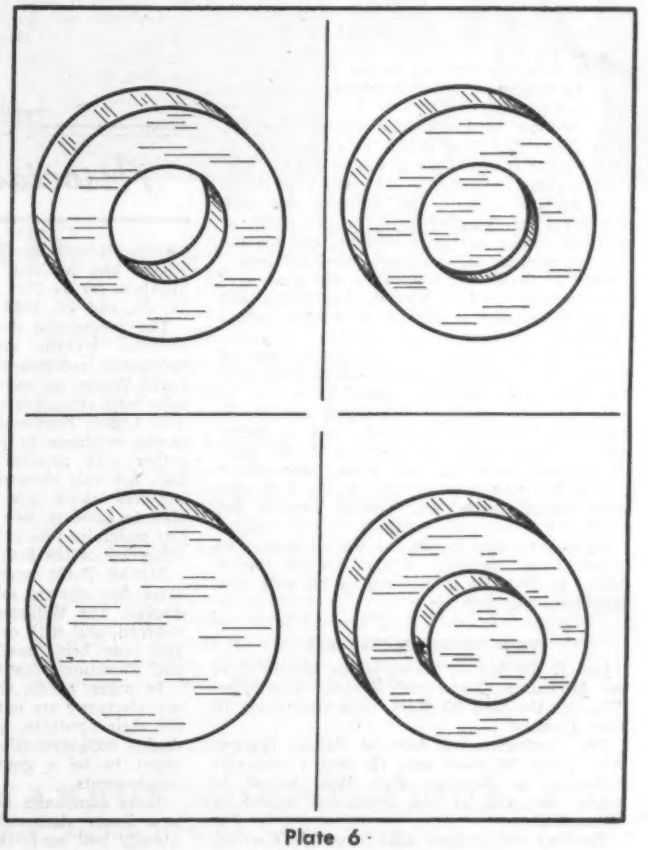


Plate 6

director of vocational education in 1900, education was just beginning to concern itself with problems of health, citizenship, vocational preparation, adult living, and the like. The curriculum was facing expansion to meet the new conditions created by the rapid growth of the city of Detroit. Mr. Trybom introduced new courses of study which reflected the growing emphasis on specialization in technical and vocational occupations.

He had the imagination and vision to see the significance of social conditions and new developments in vocational education. Within two decades his leadership was crowned with the building of the Cass Technical High School which is recognized nationally for its curriculums in metalwork, refrigeration, air conditioning, pattern-making, and automotives and aeronautics.

Born in Motala, Sweden, Mr. Trybom grew to manhood and obtained his high school education there. He shortly came to America where he began teaching at the Horace Mann School in Boston in 1889, and studied at the Sloyd Training School, graduating in 1891. He also did graduate work at Cornell University. He did extensive traveling abroad and visited manual training schools in England, Germany, France, and Sweden in 1897, and studied at Leipzig, Germany.

LEONARD WILLIAM WAHLSTROM DIES

Leonard William Wahlstrom, well known in industrial arts and vocational education circles died at the Greenwich, Conn., hospital on March 25, 1944, at the age of 66 years.

Mr. Wahlstrom was born in Moline, Ill., December 17, 1877.

He was graduated from Columbia Teachers College, and also took some work at the University of Wisconsin, and at Cornell University.

He started his teaching career in Indianapolis, Ind., where he taught manual training and later became supervisor of that department in the public school.

From Indianapolis he went to the Ethical Culture School in New York City, and taught manual training at that institution for six or seven years. In 1908 he was appointed head of the Manual Training and Industrial-Arts Department of the Francis Parker School at Chicago. At this school, where he served for about 30 years, he inaugurated woodworking, metalworking, and printing.

He became internationally known for the Santa Claus Toy Shop which he started shortly after coming to the Francis Parker School, and which became an annual event every year thereafter. Parents, alumni, and students vied with each other in donating time to the cause of repairing, reconstructing, refinishing, and making toys for orphans and underprivileged children.

While at the Parker School, he also spent several summers at West Virginia University, and at the University of Illinois as summer school instructor.

After World War I he was given leave of absence for several years to devote to rehabilitation work with disabled soldiers.

He was ever ready to help other teachers in improving themselves and their work in industrial arts and vocational education. Many helpful articles from his pen have appeared in professional magazines devoted to his field, and many acquaintances and friends bemoan his death.

He was in poor health for several years and retired from teaching at the Francis Parker School in 1941. He is survived by his wife, two daughters, and two sons.

VOCATIONAL TEACHER DIES

Joel J. Carrington, woodworking instructor at the Milwaukee Vocational School, Milwaukee, Wis., for the past 30 years, died after being ill since January.

Mr. Carrington was born at Baileys Harbor, Wis., about 70 years ago. He was a carpenter contractor at Sturgeon Bay, Wis., before he joined the staff of the vocational school at Milwaukee.

Teachers and students alike loved Mr. Carrington for his kindliness, geniality, and willingness to help.

He is survived by his wife and one son.

♦ Major William E. Warner, now "somewhere in England," on April 13 addressed the Rotary Club of Swinden in Wiltshire on the subject of "America's Schools."

Major Warner is on leave from the Ohio State University, Columbus, Ohio.

♦ Goodwin G. Petersen, former supervisor of the arts and industries program, Lincoln High School, Gahanna, Ohio, is now employed with the Hathaway Instrument Co., of Denver, Colo.

He is serving as assistant to the chief engineer in directing and co-ordinating the engineering activities in the field of strain measurement and recording equipment.

♦ Gould Morrison has succeeded Harvey Bergner as supervisor of Trades and Industry in the Madison, Wis., Vocational School. Mr. Bergner has received a commission from the Navy.

♦ Ensign Lawrence Buaaten, who was for the past two years an instructor at Navy Pier in Chicago, received his commission last December and is now stationed at Ithaca, N. Y.

♦ Stanley Drazek, former teacher of industrial arts at Liberty High School, Liberty, N. Y., has recently been inducted into the armed forces as aviation cadet, U. S. Army.

♦ Robert English, former assistant professor of industrial education at the Southern Illinois State Normal University, Carbondale, Ill., has been commissioned as a Lt. (jg) U.S.N.R.

For the past year Mr. English was on the Executive Committee as well as on the Membership Committee of the Illinois Industrial Education Association.

♦ S. S. Shake, formerly at Eastern Illinois State Teachers College, Charleston, Ill., and later at the high school at Paris, Ill., has joined the faculty of the Southern Illinois Normal University as instructor of industrial arts.

♦ H. A. Huntington, formerly teacher trainer of Trade and Industrial Education, Oklahoma Agricultural and Mechanical College, Stillwater, Okla., is now vocational adviser, Vocational Rehabilitation Division, Veterans Administration, Dayton, Ohio.

Association News

♦ The New Jersey Vocational and Arts Association met in New York City, at the Hotel McAlpin, for its 27th Annual Convention, March 23, 24, and 25, 1944.

The commercial dealers were again well represented, actually demonstrating power tools, accessories, and general supplies. The South Bend Lathe Works, for example, placed a shiny engine lathe with automatic change gearbox in its booth. The Logan Engineering Company had several power machines in the lower price range, together with accessories. Brodhead-Garrett Co., Inc., not only showed "Starrett" precision tools, but was taking orders for them. Delta was unable to earmark new units for this convention, but maintained its policy of exhibiting and operating one of the firm's jig saws.

Stanley Tools occupied a long table, including some fine electric soldering irons in the group display. The Williams Tool Company was represented, and took orders for their new teaching aids now being made available to war plants and educational institutions.

In other words, the machine and small tool manufacturers are not only meeting the demands for their products, but are gradually supplying dealers with stocks for immediate delivery. There ought to be a gradual easing off of priority requirements.

Book companies in our field presented many new issues along with well-known books that already had made the grade.

Emphasis was no longer placed on pre-induction and victory corps texts, as such. The original heavy demand for these has evidently been met.

Supervisors and administrators met on Thursday night, with John A. McCarthy, assistant commissioner of education in charge of vocational education, as chairman. Dr. R. W. Gregory, assistant director, U. S. Office of Education, discussed "The Program of Food Production War Training."

Charles W. Sylvester, director vocational education, Baltimore, Md., spoke on "Industrial Arts and Vocational Education in an Industrial Community," and Dr. Paul H. Nystrom, School of Business, Columbia University, and vice-president, American Vocational Association chose "Training for Distributive Occupations" as the subject for his discussion.

Nu Chapter, Epsilon Pi Tau, the National Honorary Fraternity in Industrial Arts and Vocational Education, held the first scheduled general meeting on Friday morning.

The president, Arthur Wrigley, State Department, presided and presented a grand program.

Dr. L. A. Wilson, Deputy Commissioner of Education, New York State Department, spoke on "Post-War Planning in Trade and Industrial Education." His remarks were very interesting to those in the industrial-arts field, and were a build-up for programs outlined by the other speakers.

Mr. John McCarthy discussed "Post-War Planning in Industrial Arts Education."

He told the group that among other things, a more general use of industrial-arts facilities would help with the juvenile delinquency problem. Small units of administration restrict the broadening of the program. The drift of industrial-arts teachers back to woodwork is unfortunate. The well-rounded general shop program more nearly meets the present situation.

Mr. Berman, assistant superintendent of the Bayonne, N. J., schools, where they have an outstanding vocational program, was listed as "discussion leader."

Lack of time cut this program rather short, but Mr. Berman emphasized the following points:

On the Pacific Coast, the program is expected to make additional use of the Junior College. *Area* schools may solve the demand for specialized courses.

New Jersey's part will probably tie in with the high school, and a thirteenth and fourteenth year may be involved. An effective guidance program is being considered.

Each state in general will no doubt work out its own particular problem.

Mr. John Seidel, assistant superintendent for industrial education, Maryland, gave us some interesting information at the luncheon.

A few high lights were:

We are getting a different type of material to work with these days, and the college preparatory course for all is definitely out of the picture.

New methods and curriculums are needed in our field of secondary education.

Co-ordinate school with work employment, to give directly helpful education to youth so that they need not be unemployed on an average of three years after leaving school, as they now are.

He illustrated his remarks with blackboard charts which were readily visualized.

One of the features of the general meeting with President Trowbridge in charge was: "The Experiences of a Woman Welder," portrayed by special agent (U. S. Office of Education) Augusta Clawson, attired in "what the well-dressed woman welder wears."

There also was a meeting for Union County, N. J., industrial-arts teachers; an informal dinner; and special group meetings for teachers of industrial arts; fine arts; girl's vocational; boy's vocational; home economics; and printing.

The usual all-convention luncheon and business meeting closed the sessions on Saturday at noon. — *G. Harold Billingham.*

♦ The Illinois Vocational Association held its annual convention at Springfield, Ill., on April 13, 14, and 15.

(Continued on page 16A)

Years ago motor and generator brushes had copper strips or wire bristles to conduct electricity from stationary to rotating parts—that's how they got their name. Carbon is now the material for all sizes of these brushes.

THEY HELP BRING THE GIANTS HOME

ONE OF the "little things" that are contributing greatly to the safety and welfare of our fighting men, is a special kind of carbon brush used in high-altitude planes. These brushes are essential to the generators and motors that supply energy for the radios, firing apparatus, gun turrets, bomb bay doors, landing gear, and other equipment of the planes. A heavy bomber has more than 40 of these devices requiring brushes.

Ordinary brushes disintegrate in a few minutes at altitudes where the air is "thin" and dry. A brush that would be dependable from take-off to ceiling and would have a life of 100 hours or more—had to be found. It came from the laboratories of NATIONAL CARBON COMPANY, INC., a Unit of UCC.

Carbon is useful in many other ways to Americans at war. Therapeutic lamps, which employ the carbon arc, are helping to restore health to sick and wounded men. Activated carbon in gas masks, by absorbing toxic vapors, is ready to save lives.

In the two-way radio telephone—the walkie-talkie and the handy-talkie—and in hearing aids for the deafened, carbon has another role. Carbon is essential in the small, powerful batteries that are used in these devices.

▼

Teachers, designers, and operators of electric motors, generators, and rotary converters are invited to send for "Modern Pyramids" K-6. This is a series of pamphlets containing practical suggestions on the performance, characteristics, operation, and application of electric motor brushes. There is no obligation.

BUY UNITED STATES WAR BONDS AND STAMPS

UNION CARBIDE AND CARBON CORPORATION

30 East 42nd Street UCC New York 17, N. Y.

Principal Units in the United States and their Products

ALLOYS AND METALS
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ELECTRODES, CARBONS AND BATTERIES
National Carbon Company, Inc.

INDUSTRIAL GASES AND CARBIDE
The Linde Air Products Company
The Oxweld Railroad Service Company
The Prest-O-Lite Company, Inc.

PLASTICS
Bakelite Corporation
Plastics Division of Carbide and Carbon Chemicals Corporation

(Continued from page 256)

The supervisors, teacher trainers, and school administrators started out with an all-day conference on Thursday, April 13, under the chairmanship of J. W. Thompson, supervisor, Trade and Industrial Education, Board for Vocational Education, Springfield, Ill.

At the Trade and Industrial Education Dinner held Thursday evening, E. J. Simon, director of vocational education, Board for Vocational Education, Springfield, Ill., presided; and A. B. Mays, professor of industrial education, University of Illinois, Urbana, Ill., acted as toastmaster.

The main speaker at this occasion was Vernon L. Nickell, superintendent of public instruction, Springfield, Ill., who spoke on the subject of "Are We Over-vocationalizing the Curriculum."

He emphasized that while cultural courses are as necessary, it must not be overlooked that the ability to earn a living and enjoy culture is equally necessary. For this reason interest in vocational education on the secondary level will have to be one of the main concerns of modern educators, and that vocational education must be made available for all.

The industrial education session held its first meeting at 9 o'clock. The chairman, on this occasion, was Paul L. Roise, vocational director, J. Sterling Morton High School and Junior College, Cicero, Ill.; and George Fern, director of vocational education, state of Michigan, Lansing, Mich., spoke on the subject, "What Does the Future Demand of Industrial Education."

He made it very plain that puttering teachers who know an academic approach to industrial education can no longer be tolerated. He also pointed out that with specific training given by skilled teachers, high school boys have been led to do work which could readily compare with that done in industry.

Industrial-arts work, he said, must be made meaningful and should be closely tied up with the vocational courses which the students will choose later on.

The chairman of this division elected for 1945 was Robert Shumway of Rockford, Ill.

Lester J. Schloerb, director of occupational research, Chicago Public Schools, was the chairman at the session of personnel and guidance which met at 10:30 a.m. Friday.

In the absence of Henry T. Heald, president, Illinois Institute of Technology, Chicago, Ill., who was called to Washington, D. C., for a conference, Dr. Henry Dutton, head of adult education, Illinois Institute of Technology, Chicago, Ill., spoke on "Some New Responsibilities of Those in Vocational Education."

The speaker pointed out that the high school must aim to give the student interests and knowledges which help the student to integrate his personality. Since but 5 to 10 per cent of high school graduates enter college, the other 90 to 95 per cent must be given education that has very specific aims, and challenges the student to call out his best efforts. They must be shown the necessity of doing things in a regular, definite way.

The Trade and Industrial Education Round Table Luncheon on Friday was presided over by Warren E. Hill, president, Illinois Industrial Education Association. At this meeting C. C. Caveny, Commander, U.S.N.R., Educational Officer, Naval Air Technical Training School, Navy Pier, Chicago, discussed "Post-War Trade and Industrial Education and Training."

He emphasized that everyone's education should include academic work, industrial arts, and vocational training. That in the postwar era academic work must again return to a definite program with less elective courses. Industrial arts must be expanded, be definitely nonvocational, and present a broad overview of occupations.

Vocational education must be made definitely occupational training and not glorified industrial-arts courses.

The speaker advocated trade schools established by states to cost no less than 3 million dollars each, with the equipment furnished by the Federal Government.

F. T. Curl, J. Sterling Morton High School, Cicero, Ill., was the chairman of the sectional meeting on printing. Ben Wiley, typographic stylist, Frye Printing Co., Springfield, Ill., gave an interesting and instructive talk on "Modern Layout and Design," which was illustrated by many practical examples.

The chairman then explained how the wide-awake teacher of printing could make many of his own visual aids.

Paul Schoenhoff, Waukegan, Ill., was elected as the chairman of this session for the coming year.

At the annual business meeting C. A. Carlson, director of technical subjects, High Schools, Chicago, Ill., was elected president.

J. E. Hill, president, Illinois Vocational Association, Springfield, Ill., was the chairman at the annual I.V.A. dinner meeting. Immediately after the dinner, Vernon L. Nickell was introduced as toastmaster and he presented Carl A. Gray, president, Grenby Manufacturing Company, Plainville, Conn. (author of the Gray Plan), and president, Connecticut Vocational Association, who was the speaker of the evening.

He chose for his title "The Importance of the Schools in the Conversion Period," and pointed out that before America can claim to have reached its adulthood, religion and education must overcome the gadget worship which America is now practicing.

In spite of assertions so frequently heard, there are still new frontiers, and opportunities, now as ever, still in the future.

Advances in airplane development, plastics, electronics, all point to very definite opportunities for still greater victories to be won.

C. I. Carlson, East High School, Aurora, Ill., was the chairman at the Saturday morning industrial-arts meeting. At this meeting, Arthur B. Mays spoke on "Relating Industrial Arts to the Needs of a New Day."

He showed that the future would inevitably demand higher standards in all phases of education, because people, in our age, must know more and have broader appreciations, since the general level of knowledge is rising.

Greater skill will be demanded from our students and they must have better work habits than were required in the past.

Industrial-arts teachers have a real opportunity ahead of them; and they should begin now to analyze the war experiences so that our area in the general education field can be prepared to fully represent the industrial world in the cultural education program.

At the Illinois Vocational Association general meeting held Saturday morning under the chairmanship of J. E. Hill, president, Illinois Vocational Association, Springfield, Ill.; E. J. Simon, director, vocational education; and C. C. Caveny, a few general remarks were made on the tasks that lie before those working in the fields of industrial arts and vocational education.

Then the "Ship" took over and its program brought to a close a very successful I.V.A. convention.

♦ The annual meeting of the Executive Committee of the Iowa Industrial Arts Association was held at the Roosevelt Hotel in Cedar Rapids on April 15. The business session of the meeting was devoted to formulation of plans for the revitalizing and reorganizing the association's program so as to be of greater service to industrial arts in Iowa.

The officers for 1944 are: D. M. Burkhiser, Dubuque, president; R. T. Henning, Davenport, vice-president; C. W. Bootman, Des Moines, secretary-treasurer. The members of the board of trustees are: L. A. Benz, Ames; H. G. Palmer, Cedar Falls; E. J. Reinel, Council Bluffs; L. J. Swartz, Marshalltown; and A. P. Twogood, Ames.

♦ The annual meeting of the California Industrial Education Association was held at Sacramento, Calif., on April 22. Industrial teachers from all parts of the state attended.

Among those who attended from Oakland were: H. N. Wright, Supervisor of War Production Training; Mrs. Eleanor Hewlett, Assistant Supervisor and her guest, Miss Augusta H. Clawson, Special Agent, War Production Training for Women, U. S. Office of Education; M. H. Maddern, Assistant Supervisor; Will W. Green, Acting Supervisor of Industrial Arts; Paul D. Thomas, Principal of Central Trade Evening School; Blake W. Spencer, Acting Principal; Loren Stevens, Tom Cole, Kenneth Ferrell, Fred Tusher, Edward Bratset and Walter Huston, all of Central Trade School.

Over 250 men and women attended the all-day meeting. At the general session, George C. Jensen, Assistant Superintendent of Sacramento City Schools, spoke on "Problems Before Us in Industrial Education" and the State Superintendent of Public Instruction, Dr. Walter F. Dexter, gave a very excellent preview of the future plans of the state department concerning education and trade and industrial education in particular. He also announced the appointment of Samuel L. Fick to succeed the late J. C. Beswick as Chief of the Bureau of Trade and Industrial Education and State Director of Vocational Training for War Production Workers. Mr. Fick was formerly assistant to Mr. Beswick with offices in southern California. The best wishes of all those connected with industrial arts and vocational education are with Mr. Fick in his new capacity.

Luncheon was served in the dining room of the C. K. McClatchy High School by the home-economics department of that school. At the luncheon, Colonel A. R. Heron, Director, California Commission for Reconstruction and Re-employment, gave an illuminating talk on "Who Must Furnish Post-War Jobs."

The afternoon session was devoted to conferences on Trade and Industrial Education, Industrial Arts and Apprenticeships.

The next meeting of the association will be held in the southern part of the state.

♦ The thirteenth annual convention of the Indiana Industrial Education Association was held in the Claypool Hotel, Indianapolis, Ind., on April 27, 28, and 29.

The war-production training directors held their meetings on Thursday morning and afternoon.

In the absence of Glen Barkes, vice-president of Indiana Industrial Education Association, Bloomington, who is ill, Dennis H. Price, president of the I.I.E.A., presided at the opening luncheon meeting of the regular convention sessions on Friday noon.

Hon. Henry F. Schricker, Governor of Indiana, welcomed the members of the association and wished them good luck in their deliberations.

Ralph N. Tirey, president, Indiana State Teachers College, the next speaker, emphasized the need of educating the whole man during his whole life so that he can live happily with his neighbor. Education must be the development of mind, body, and soul. We must make the child a thinker rather than a receptacle for a mass of facts.

We must train the bodies of all, not only of a few, and the health of the student deserves much more thought than is now given to it.

We must educate youth and adults not only to live and let live, but be ready to help others live — the Christian principle which Christ taught but which we have not tried out.

Dr. F. K. Perry, chairman, division of arts, Colorado State College of Education, Greeley, Colo., then spoke on "What Will the Postwar Arts Be Like."

The speaker emphasized that what is going to happen after the war depends upon what we are doing now to improve our program. Change occurs only when someone sees a need for a change and does something about it.

There is no common solution for all of the problems arising in the educational systems the country over. Each teacher must try to solve his own problems as they arise; as the successes of the various experiments are adopted and adapted by others so will our industrial-arts offerings gradually, not miraculously, change for the better.

Industrial-arts teachers must know the objectives of their work and be able to state them and defend them if necessary. But having objectives is not enough; they must also be applied and evaluated.

(Continued on page 19A)

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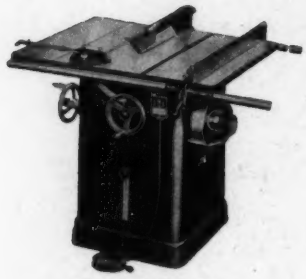

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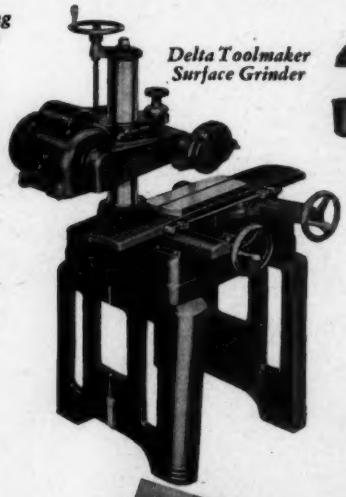
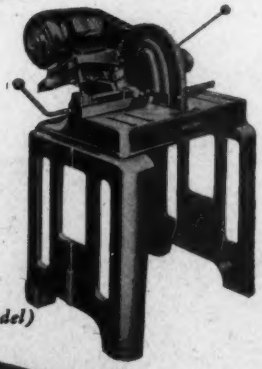


Delta Toolmaker Surface Grinder

Delta Industrial Grinder with safety shields

Delta 12" Woodworking Lathe



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8-6

(Continued from page 16A)

Laboratory schools should be nurtured because they offer opportunities for experiment and research.

The annual banquet Friday evening was presided over by Dennis H. Price.

Professor Ammon Swope, Purdue University, was the toastmaster.

Virgil Stinebaugh, acting superintendent of Indianapolis Public Schools, welcomed the association to Indiana and Dr. M. S. Lewis, Indiana University, responded.

"Dusty" Miller, humorist, editor, and philosopher, Wilmington, Ohio, in his address entitled "Your C Card," expressed many serious thoughts in a highly humorous manner.

At the after-breakfast meeting, at which Russel W. Ihne, president, Mu Chapter, Iota Lambda Sigma, presided, Dr. F. K. Perry in a delightfully humorous way told of the value of a good hobby in his address on "Screwy Ideas About Leisure." He strongly emphasized that leisure is not waste time, but if rightfully used, is highly useful.

At the general session on Saturday morning under the chairmanship of Dennis H. Price, E. J. Simon, director of vocational education, Board for Vocational Education, Springfield, Ill., spoke on "What Has Industrial Arts and Vocational Education Gained From Our War Experience."

He showed that both of these educational fields have gained great recognition and popularity, and that they must be much broadened and enriched, and made accessible to all, if the term equal educational opportunities is to mean anything at all.

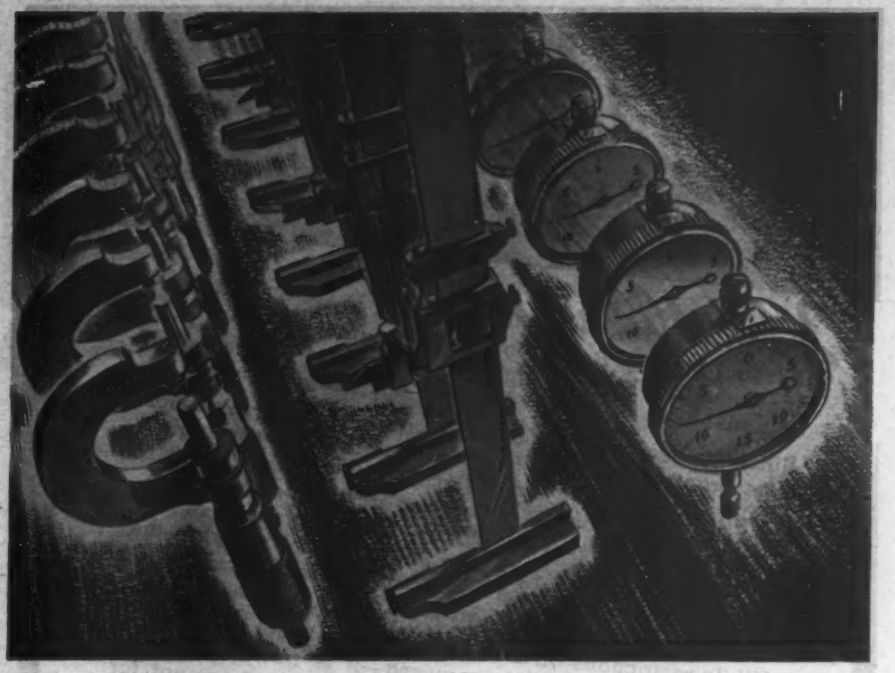
Allen T. Hamilton, Office of Education, Washington, D. C., then gave a short address on "Post War Planning for Industrial Education," advocating that all teachers interested in industrial arts and vocational education should carefully study the many things that may influence the postwar and reconstruction era. Local community survey and a study of data gathered by federal bureaus may be helpful in this.

At the business meeting the following officers were elected for the coming year. Glen Barkes, Bloomington, president; and Alfred P. Smith, Indianapolis, vice-president. H. G. McComb, Indianapolis, will continue as secretary-treasurer.

At the Saturday luncheon Dennis H. Price, presided, and H. G. McComb, director of war-production training for Indiana, acted as toastmaster.

The address on this occasion was given by Lothair Teeter, president, Perfect Circle Company, Hagerstown, Ind. His subject was entitled "From High School to Industry." The speaker placed special emphasis on the need of giving high school students an understanding of the need to be self-reliant, industrious, ready to assume responsibility, to possess self-discipline, have a good character, be religious and tolerant of other people's religious beliefs.

Top, left to right: Harold DeLong, T. W. Hoover, and F. L. Zwickey. Bottom: Earl L. Bedell, E. R. Doll, and G. E. Peacock



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The "Ship's" program followed Mr. Teeter's address.

♦ At a recent election of the Mu Sigma Pi Fraternity of Wayne University, Detroit, Mich., the following officers were elected to serve for the ensuing year:

President, E. R. Doll; vice-president, F. L. Zwickey; corresponding secretary, T. W. Hoover; recording secretary, A. S. Dunham; treasurer, H. A. DeLong; president of executive board, G. E. Peacock; member of executive board, C. L. Pozzini; and faculty adviser, Earl L. Bedell.—*G. H. Silvius.*

♦ The Westchester County Industrial Arts Club of New York State held its annual spring Superintendent's and Principal's night at the Edison Technical High School at Mt. Vernon, N. Y. The hosts, Dr. Martin, superintendent of the Mt. Vernon School's; Miss Milligan, the principal of Edison Technical High School; Mr. Cullen, principal of the Night School; and Mr. Faust of the teaching staff, provided a tour of inspection of the evening school classes in session. Preceding the meeting, the club entertained Mr. Furney of the New York State Vocational Education department at a dinner, and later he spoke to the entire meeting assembled on the recent developments in industrial arts and vocational education, placing emphasis on the planning necessary to meet the needs of youths and adults after the war. He also stated that now is the time to re-evaluate the needs of industry in preparation for the planning of future vocational training. Mr. Paul Ansel presided over the meeting of about one hundred people.—*George E. Baldwin.*

♦ An all-day Executive Conference of the American Industrial-Arts Association, Newark, N. J., will be held at the Hotel Pennsylvania, New York City, on Saturday, May 20, 1944, beginning at 9:30 a.m.

Since it is of utmost importance in these critical times, to approve legislation, committee

(Continued on next page)

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To School Administrators

Revised Priority Regulation P-43, as amended March 6, indicates that Federal Authorities recognize the necessity of continuing scientific education without interruption.

Since the beginning of the war—unless special permission was granted by the War Production Board—existing restrictions would not permit the manufacturing of Laboratory Furniture. NOW—educational institutions may automatically apply an AA-2 Priority to the purchase of Laboratory Equipment. This means that orders carrying this priority may be scheduled for production in accordance with the importance that an AA-2 rating carries.

While restrictions on new buildings have not been eased —special permission is required—it is now possible to purchase new replacement or additional equipment for existing rooms. Just how long the War Production Board will permit the manufacturing of this equipment we do not know. Therefore, if you urgently need any equipment which Sheldon manufactures we suggest that you take advantage today of the opportunity that exists.

If you need information as to how you may automatically apply an AA-2 Priority to the purchase of Sheldon Laboratory Furniture wire or write. If you need assistance on equipment design or requirement problems let us know and our Field Engineer will call.

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(Continued from previous page)

assignments, publications, affiliation of other organizations, memberships, etc., and to elect officers for the year 1944–45, the participation of all members in united efforts to promote sound industrial-arts education through your national association, will be appreciated.—*Everett J. McIntosh*, President; *John J. Hatch*, Executive Secretary.

♦ The ninth annual convention of the Wisconsin Association for Vocational and Adult Education was held on May 5 and 6, 1944, at the Hotel Schroeder, Milwaukee, Wis.

John F. Jones, president of the association, presided at the first general meeting at 9:30 a.m. Friday. Herman F. Geske, state chaplain, Army and Navy Union, and a member of Milwaukee Vocational School faculty, dedicated a memorial plaque to the memory of George P. Hambrecht, former director of the state board of vocational and adult education, who died recently.

Dr. John J. Lee, Wayne University, Detroit, Mich., gave an interesting address entitled "When Our Yanks Come Marching Home." With the large number of men already returning, and the subsequent influx of probably 3,500,000 men who were at the front, and on their return want vocational education, will pose a real problem for vocational education.

The schools will have to prepare for this task, and to this end improve their position with the communities so that the required money for these additional educational requirements will be forthcoming.

John D. Jones, Jr., associate editor, *Hoard's Dairyman*, Fort Atkinson, Wis., then gave a very instructive talk on "Agriculture and Its War and Peacetime Relationships."

Sectional meetings on agriculture, circuit teachers, commercial, co-ordination, distributive occupations, rehabilitation, automotive service, drafting, electricity, machine shop and welding, printing, sheet metal, and woodworking, were held on Friday afternoon.

Luncheon meetings were held by the following groups: general subjects, homemaking, local board members, secretaries and office workers, and trades and industry.

The local board members, at their luncheon meeting, at which Fred M. Mason, Board of Vocational and Adult Education, Madison, Wis., presided, were addressed by William J. Grede, of the Grede Foundries, Inc., Milwaukee, Wis. He discussed the topic, "What Vocational Schools Have Done for Industry and What Industry Expects of Vocational Education in the Future."

He emphasized that schools should train students to think as well as to do; implant in them an understanding of good citizenship, honesty, integrity, pride in themselves and their work; and an appreciation of the tools and the machinery with which they work.

Resolutions were passed: (*a*) to extend a vote of appreciation to the state legislature for raising the state aid for vocational education from $250,000 to $420,000; (*b*) to favor legislation for setting up county or larger area schools to make vocational education available to all communities in Wisconsin; (*c*) to oppose any and all attempts to do away with Wisconsin's "Dual System" which has done so much for vocational education in our state.

A brief discussion showed that the members of the local boards of vocational and adult education were not at all in favor of any movement to grant them any remuneration for the services which they render as board members.

Fred M. Mason, Madison, Wis., was elected chairman of this group for the coming year.

At the general meeting held on Saturday morning, Clare D. Rejahl, secretary-treasurer, acted as chairman. The address was given by Walter Johnson, University of Chicago, Chicago, Ill., who spoke on "Do We Want to Return to Normalcy?"

At the business meeting the following officers for the coming year were elected:

President—Miss M. Medora Roskilly, Racine, Wis.; vice-presidents—Marty Schnurr, Wilmot, Wis., for agriculture; Wm. Enge, Eau Claire, Wis., for trade and industry; Leonard Heise, Wausau, Wis., for rehabilitation; secretary-treasurer—Clare D. Rejahl, Beloit, Wis.

The "Skiff's" program followed the business meeting with deck officer, John Claude of The Bruce Publishing Co., and Captain Charlie Roper of McKnight and McKnight, in charge.

Milford Hamlin, American Type Founders, led the community singing, and Lew Webb, American Technical Society, was the accompanyist at the piano.

New Publications

Elementary Principles of Diesel-Engine Construction

By Members of Teaching Staff, Mechanics' Institute and Boys' Technical High School under the direction of Thomas G. Brown and F. W. Ziegenhagen. Cloth, 141 pages, 5⅞ by 8⅛ in., illustrated. Price, $2. The Bruce Publishing Co., Milwaukee, Wis.

A new revision of this concise text on the vital subject of Diesel engines.

The book is divided into 12 chapters which discuss the development of heat engines, principles of the internal-combustion engine, types of engines, Diesel combustion methods, fuel-injection systems, Diesel starting systems, auxiliary equipment, modern Diesel engines, fuel oils and lubricants, and Diesel power applications.

A set of questions for study and discussion are found at the end of each chapter. The book also contains a number of formulas, tables, definitions, and the like, all gathered in one chapter for ready reference.

Electrical Essentials of Radio

By Morris Slurzberg and William Osterheld. Cloth, 529 pages, 5½ by 8½ in. Price, $3. Mc-

(Continued on page 23A)

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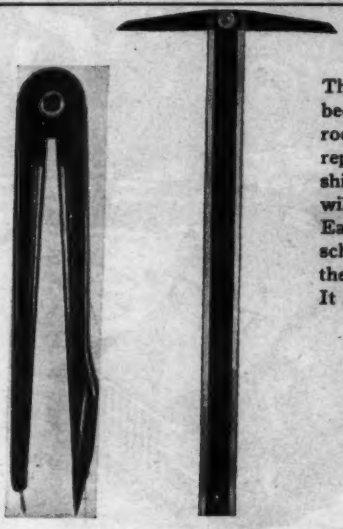

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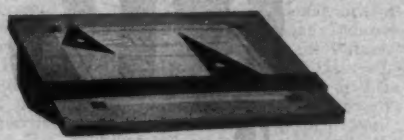

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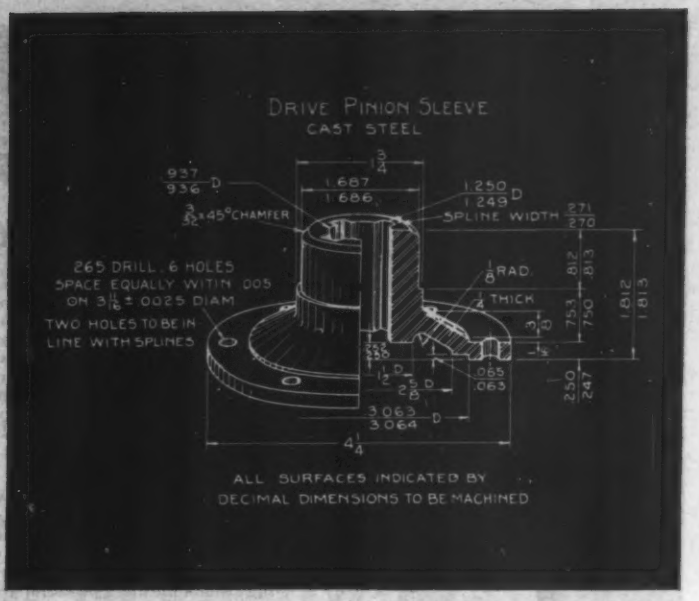

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(Continued from page 20A)

Graw-Hill Book Co., Inc., New York City.

A book on the theory of electricity, especially as it is applied to radio practice. It is a useful book for the student as well as for the radio mechanic who wants to keep abreast of the times. It is copiously illustrated, and contains many problems showing all of the steps required for their solution.

The appendix contains a number of tables which will be found very useful in making electrical calculations.

Marine Pipefitting

By Vern E. Hase and Ralph W. Allen. Cloth, 325 pages, 6 by 8⅜ in., illustrated. Price, $3. The McGraw-Hill Book Co., Inc., New York City.

This textbook is especially intended for the apprentice or journeyman pipe fitter whose duty it is to place the miles of piping which go into the modern ship.

To assist the marine pipe fitter the book contains one chapter which explains the meaning of many of the words used aboard ship.

It also contains explanations of the various piping systems found on ships, and explains the processes of brazing, lead-working, blueprint reading, and the making of pipe layouts.

Basic Radio

By C. L. Boltz. Cloth, 272 pages, 5⅜ by 7¾ in. Price, $2.25. The Ronald Press, New York, N. Y.

An elementary text on the principles of radio. It is divided into 17 chapters which explain the fundamentals of electricity, condensers, inductance and capacitance, waves, oscillators, detection, amplification, receivers, and aerials.

The appendix contains a short wire table, and the answers to the problems in the book.

Work Methods Manual

By Ralph M. Barnes. Cloth, 136 pages, 5⅝ by 8½ in., illustrated. Price, $1.75. John Wiley and Sons, New York City.

A guide for supervisors, foremen, and workers on how to organize their work so that it can be done with greater economy and efficiency.

The problem of making job breakdowns, flow diagrams, activity charts, and motion studies also is explained.

Aviation Mathematics

By C. A. Felker, E. A. Schweinhagen, and H. W. Paine. Cloth, 356 pages, 5¾ by 8⅝ in., illustrated. Price, $2.72. Published by The Bruce Publishing Co., Milwaukee, Wis.

This very complete mathematical treatise on aviation mathematics shows applications of the mathematical processes to hundreds of problems in the field of aviation.

It contains a review of the common arithmetical operations, and explanations on the use of measuring instruments, the English and metric systems of measurement, algebras and formulas, square root, the slide rule, graphs, logarithms, trigonometry, simple mechanics and aerodynamics, and the essentials of air navigation.

The book also contains tables of logarithms and trigonometric functions.

Elementary Mathematics for the Machine Trades

By John J. Weir. Cloth, 193 pages, 5⅝ by 8⅛ in., illustrated. Price, $2. The McGraw-Hill Book Co., Inc., New York City.

A book for the beginner in machine-shop work. Besides an arithmetical review, it contains some algebra, geometry, and trigonometry, and shows how this information can be applied to machine-shop problems.

Airplane Maintenance

By John E. Younger, Allan F. Bonnalie, and Nairne F. Ward. Cloth, 361 pages, 5½ by 8½ in., illustrated. Price, $4. Published by McGraw-Hill Book Co., New York, N. Y.

A textbook for the beginner who wants a working knowledge of the things which the aircraft mechanic must know.

The book is well illustrated, and each chapter contains a list of review questions, and selected references for further study.

Elements of Automotive Mechanics

By Joseph Heitner, Norman G. Shidle, and Thomas A. Bissell. Cloth, 395 pages, 6⅜ by 9¼ in., illustrated. Price, $1.92. D. Van Nostrand Co., New York, N. Y.

A textbook designed for use in preinduction training. The book is divided into nine parts in which the subject is treated under the following headings: The motor vehicle, running systems and bodies, the power unit, power train, cooling system, fuel system, electrical system, lubrication, and safety.

Careers in Commercial Art

By J. I. Biegeleisen. Cloth, 276 pages, 5⅜ by 8¼ in., illustrated. Price, $2.75. Published by E. P. Dutton & Co., Inc., New York, N. Y.

An introduction, for those who are interested, into the fields of the commercial artist, the sign painter, show-card artist, typographer, trademark designer, wrapper and package designer, illustrator, poster artist, garment designer, wallpaper and textile designers, cartoonist, and similar occupations.

Shipyard Diary

By Augusta H. Clawson. Paper cover, 4¼ by 6⅜ in. Price, 25 cents. Penguin Books, Inc., New York, N. Y.

An interesting account of how a woman—a special agent for the U. S. Office of Education—obtained employment in the Kaiser shipyard, in order to get firsthand information on why there was such a big labor turnover among the women workers who were sent to the shipyards to take the place of men who had been inducted into the army.

The book is full of human interest, and a fine analysis of the problem that confronted the new women workers and the shipyards which were to absorb them.

Art and Materials for the Schools

By Sibyl Browne, Ethel Tyrrell, Gertrude M. Abbihl, Clarice Evans, and Others. Service Center Committee, Progressive Education Assn., 221 West 57th St., New York 19, N. Y. Price, $1.25. To members of the Progressive Education Assn., 75 cents.

Filing Hints To Meet Your Needs

Right Way to Hold a File

Fig. 1. Right way to hold a file with both hands.

Hold the handle of the file with the right* hand, and the tip of the file with the left hand. Although the position of the left hand varies with the job to be done, the right-hand grip remains the same. See Fig. 1. The beginner should let the file handle rest in the palm of the right hand, with the thumb lying along the top of the handle and the fingers curling around the handle and falling into a natural grip.

Fig. 2. Correct grip for removing stock rapidly.

When the tip of the file is gripped with the left hand, as shown in Fig. 2, with the ball of the thumb pressing upon the top of the file and lying in line with the file axis, and with the fingers winding around the file, a powerful grip is secured. When a lighter stroke is wanted, the direction of the left thumb is changed more and more until it lies at right angles, or nearly so, with the length of the file. The tip of the file is then held between just the thumb and the first two fingers of the left hand.

Fig. 3. Correct grip for flat filing.

Fig. 3 shows the correct method of holding the file for flat filing. Fig. 4 shows the correct method of holding the file for very accurate work, or when curved surfaces are to be filed. The grip shown allows maximum guidance and control.

Fig. 4. Correct grip for precision work.

Awarded to the Newcomerstown, Ohio, Plant

*The directions given are for a right-handed person. By reversing the file positions, they will apply as well for a left-handed person.

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Shop Equipment News

New Products — Publications

DELTA BLUE BOOK ON ADAPTING STANDARD MACHINES

Seventy-four pages of excellent illustrations and descriptive material which give a comprehensive picture of what 79 nationally known industrial firms have done in the way of making special purpose machines out of standard Delta-Milwaukee machines and parts.

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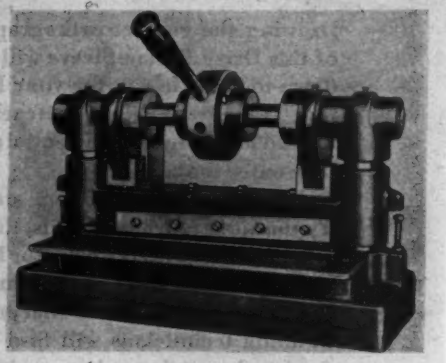
For a copy of this "Blue Book" write to The Delta Manufacturing Co., 600-634 E. Vienna Ave., Milwaukee, Wis.

For brief reference use IAVE — 610.

A PRECISION SHEAR

The Di-Acro Shear No. 3, the latest product of the O'Neil-Irwin Manufacturing Co., Minneapolis 15, Minn., is a precision built unit that incorporates a number of changes and refinements.

The finished unit weighs in excess of 150 lb., with all moving parts properly weighed and balanced to distribute shearing load which provides a unit that can be very easily operated. The new model offers and incorporates many features and facilities for shearing and blanking



Di-Acro precision shear

out parts and pieces to die shapes with die accuracy.

A 40-page catalog is available upon request. It covers the Di-Acro Shear No. 3, and the various other products that are employed in the new engineering technique embodied in the Di-Acro System of the dieless duplicating.

For brief reference use IAVE — 611.

HAMMOND HEAVY DUTY CHIP BREAKER AND DIAMOND FINISHING GRINDER

The Hammond Machinery Builders, Inc., 1665 Douglas Ave., Kalamazoo 54, Mich., announce a new heavy-duty chip breaker and diamond finishing grinder known as Model CB-76 — Hammond Chip Breaker and Diamond Finishing

Model CB-76 Hammond heavy-duty chip breaker and tool grinder

Grinder. This heavy-duty grinder is built to meet the requirements where many carbide tools must be ground. It is designed for accurately grinding chip breaker grooves, and for precision finishing of all single point carbide tipped tools requiring smooth, sharp cutting edges. The grinder is powered by a ¼ h.p. motor. The 1½-gallon coolant tank has many times more capacity, and coolant runs down into removable container for convenience in quickly refilling the coolant tank. The machine weighs 750 lb.

For brief reference use IAVE — 612.

(Continued on page 26A)

It's Not Too Soon to Begin Making REHABILITATION PLANS

THIS will be a tremendously big program — and just as essential to America's future as the war program.

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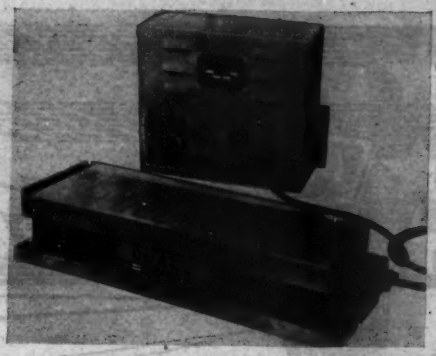
CLEVELAND, OHIO

(Continued from page 24A)

RECTIFYING AND DEMAGNETIZING UNIT AND MAGNETIC CHUCK

The new DoALL Electro-magnetic Chuck, and the Selectron, a current rectifying, demagnetizing and power varying unit, manufactured by Continental Machines, Inc., 1301 Washington Avenue South, Minneapolis 4, Minn., is described and illustrated in a four-page bulletin which may be had free.

This bulletin shows how the DoALL Selectron, an electronic device, furnishes d.c. power, gives the operator control over the magnetic pull from the chuck, and also demagnetizes the chuck. The variable magnetic pull makes possible the grinding of difficult jobs such as flat warped pieces. This Selectron has a capacity of 175 watts, operating on 220 or 440 volts to produce 220 volt d.c. current. The Selectron will operate any chuck drawing up to 175 watts.



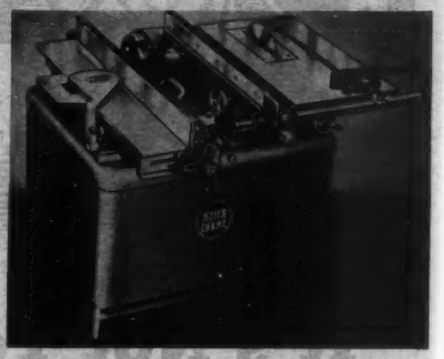
Rectifying and demagnetizing unit

The all-steel, waterproof DoALL Electro-magnetic Chuck is offered in two sizes, 6 by 18, and 8 by 24 in., wired for operation on 110 or 220 volts d.c. current. Both units are complete and ready to plug in for operation.

For brief reference use IAVE—613.

COMBINATION SAW AND JOINTER

The famous 10-in. tilting-arbor saw and long tabled 6-inch jointer with patented front and rear fence locks, produced by Boice-Crane Co., 932 Central Ave., Toledo, Ohio, have now been



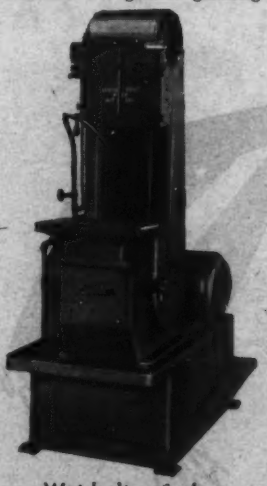
Ten-inch saw and six-inch jointer

completely mounted together on a steel floor stand. Both units are driven by one motor, with no interference. The combination is ideal where space is limited.

For brief reference use IAVE—614.

NEW PORTER-CABLE WET BELT GRINDER

The new Model AG–8 Wet Belt Surfacer, just put on the market by the Porter-Cable Machine Co., of Syracuse, N. Y., is equipped with a 35-gallon self-contained recirculating pump system, and features greater coolant capacity and more rigid construction for greater grinding accuracy.



Wet-belt grinder

Type AG–8 is used for grinding steel, aluminum, bronze, magnesium, glass, plastics, fiber, hard rubber, ceramics, etc. Such hazards as heating, warping, discoloring, flowing, and chipping of material being ground are completely eliminated.

For brief reference use IAVE—615.

A 20-IN. SLIDE RULE

The Eberhard Faber Pencil Co., 37 Greenpoint Ave., Brooklyn 22, N. Y., have produced a circular slide rule, the multiplication and division scales of which are equivalent to those found on a 20-in. straight slide rule.

Besides the multiplication and division scales, this slide rule also has scales with which the squares and cubes, and the square roots and cube roots of numbers may be obtained.

(Continued on page 30A)

It means, in this case, that there are tens of thousands of Crescent Woodworking Machines in daily operation all over the country in every type of industry. It is significant because your students are very likely to be called upon to operate a Crescent Woodworking Machine after you have trained them. Significant, also, is the fact that the highest type of production standards have always been rigidly observed enabling Crescent Woodworking Machines to enjoy the continued confidence of both the woodworking industry and vocational instructors. Still another point is the low maintenance cost of Crescent equipment. (The all-time average replacement cost is less than 5 cents per month, per machine!) In addition the product of a fifty year concern has the advantage of highly developed engineering knowledge from which stems greater accuracy, advanced safety devices, and many other desirable features. You can always choose Crescent equipment with the utmost confidence in their quality, safety and their ability to help you provide a more thorough training program.

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Details are contained in a free booklet, *"Textron Fellowships"*, which will be mailed on request. Write to: Director of Admissions, Rhode Island School of Design, 8-D College Street, Providence 3, Rhode Island.

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BASIC MATHEMATICS FOR WAR & INDUSTRY *by P. H. Daus, J. M. Gleason, and W. M. Whyburn,* clearly explains all the mathematical principles and procedures needed by machinists, carpenters, radio men, and others in industry, the skilled trades, and the Armed Forces, with many up-to-date examples and 800 very practical applied problems for training. Arithmetic, algebra, plane and solid geometry and plane and spherical trigonometry are covered. ($2.00)

THE CRAFTSMAN PREPARES TO TEACH *by D. F. Jackey and M. L. Barlow,* gives clear, simple directions for preparing the subject matter for and applying successful teaching techniques to all kinds of shop courses. Written by men who have been in charge of trade and industrial teacher training in California, this is a most practical text for teacher-training courses and a most helpful handbook for inexperienced shop teachers. ($2.00)

and the just-published

PRACTICAL ANALYTIC GEOMETRY WITH APPLICATIONS TO AIRCRAFT, *by Roy A. Liming.* This book makes generally available for the first time the new and highly efficient techniques developed at North American Aviation, Inc., for lofting, tooling and other basic engineering processes in the automotive, marine, and aircraft industries. Full 8-place tables of natural trigonometric tables are included by special permission of the Monroe Calculating Machine Company, Inc. ($4.50)

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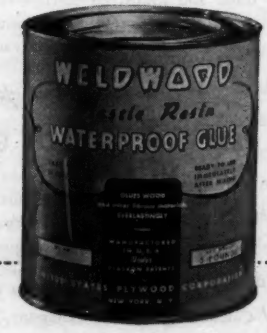

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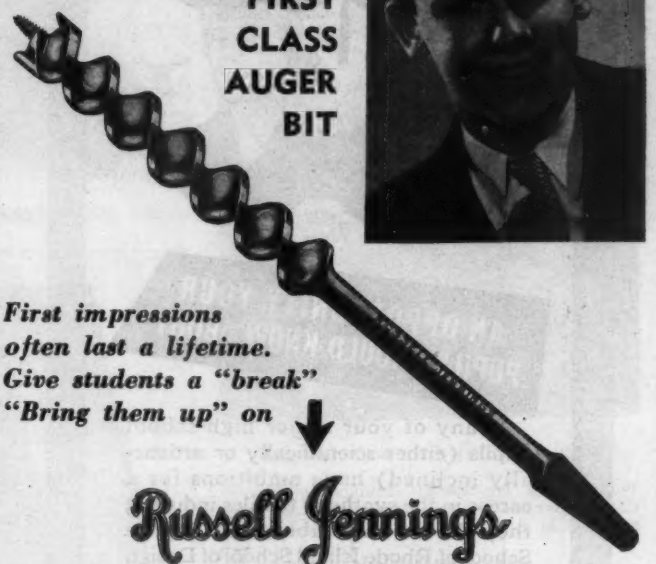

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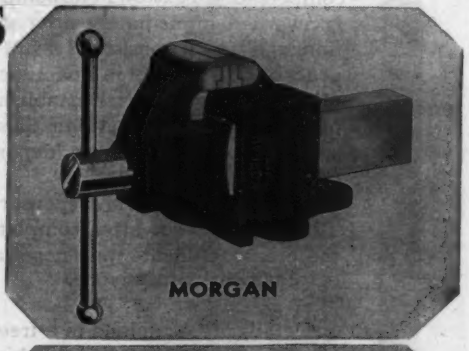

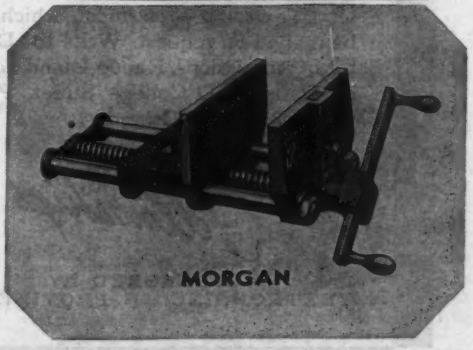

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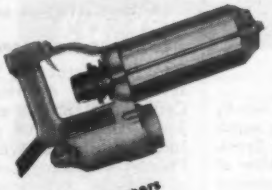

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(Continued from page 26A)

Wartime production has made a knowledge of the use of the slide rule a necessity for many workers. This mechanical-mathematical device will be used more and more, and many teachers will want to become acquainted with it.

20-in. slide rule

Here is an opportunity to get an accurate slide rule at the nominal cost of 25 cents.

For brief reference use IAVE — 616.

NEW WELDING CHART

An entirely new, 23 by 35 in., arc-welding inspection chart, designed so that operators and inspectors can tell at a glance whether welds are being properly made, has just been published by The Lincoln Electric Co., Cleveland, Ohio.

The chart should prove extremely helpful to everyone interested in arc welding. It is printed in two colors on a heavy grade of stock, and is available without charge to instructors and others concerned with welding.

For brief reference use IAVE — 617.

C. D. PROCTOR APPOINTED SALES MANAGER

C. D. Proctor has been appointed sales manager of the American Type Founders Sales Corporation, it was announced by Thomas Roy Jones, president of American Type Founders, Inc., 200 Elmore Ave., Elizabeth 13, N. J. Mr. Proctor has been manager of sales development of the sales corporation since 1940.

Prior to his association with ATF, Mr. Proctor was promotion manager of American Sales Book Company for seven years; and before that, general promotion manager of Remington-Rand for six years.

F. B. Heitkamp, vice-president of American Type Founders, who was formerly in charge of sales, will now devote his full time to planning and co-ordinating the various activities of the parent company and all subsidiaries.

K. R. BURCHARD WITH AMERICAN TYPE FOUNDERS

Announcement has just been made by American Type Founders, of the appointment of Kenneth R. Burchard to be in charge of offset sales at the Company's general office in Elizabeth, N. J.

Mr. Burchard has been connected with the graphic-arts field for 20 years, and was formerly Director, The Central High Press, Muskogee, Okla., and a member of the faculty in the Printing Department at Carnegie Institute, where his specialty was photolithography and offset press-work. He received his A.B. degree from William Jewell College, Liberty, Mo.

NEW OHMITE CATALOG

The Ohmite Manufacturing Company has issued a new catalog of their stock. This catalog, No. 18, has been published with the aim of being as helpful as possible to the users of rheostats and resistors. Besides the units listed in this catalog, the Ohmite Manufacturing Company makes many special rheostats, resistors, chokes, switches, and mountings. For further information and specifications on the type of unit desired, write to Ohmite Manufacturing Company, 4835 West Flournoy St., Chicago, Ill.

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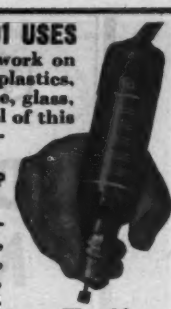
Does precision work on metals, alloys, plastics, wood, horn, bone, glass, etc. Original tool of this type and the favorite today.



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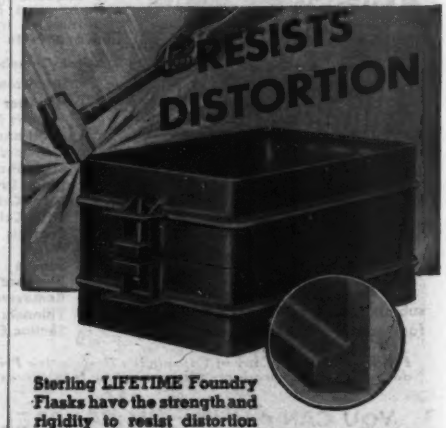

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The COMPLETE LINE of BALDOR Grinders (bench and pedestal types) described in BULLETIN 307. Ask for it.

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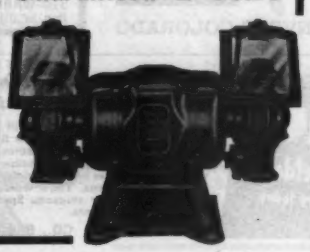

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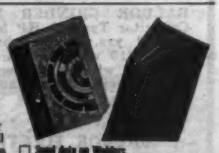

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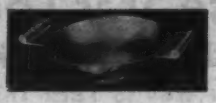

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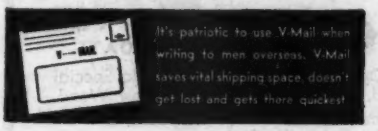
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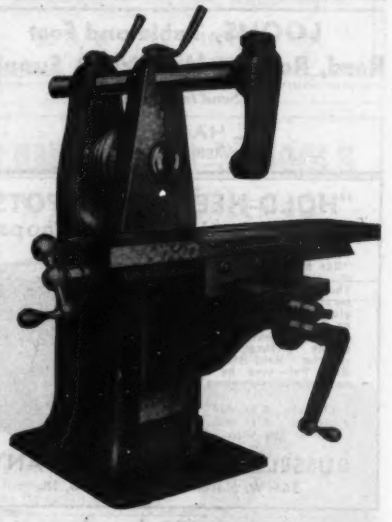

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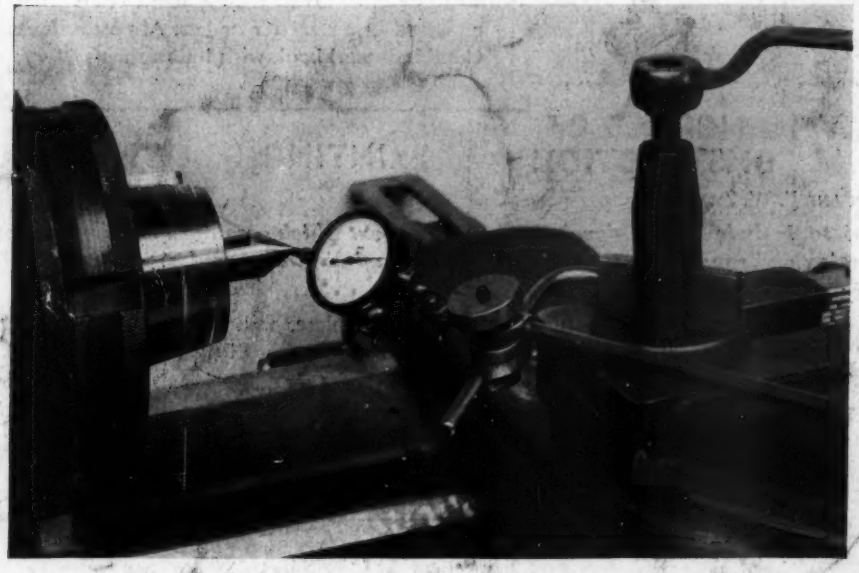

1 — Most likely to be the fault is the presence of dirt or chips in the taper hole between spindle and center bushing or between center bushing and the center itself. Remove the center and center bushing and clean the taper holes in the spindle and center bushing and the outside of both center bushing and center.

2 — A second source of trouble may be a burr or scratch on the surface of the spindle taper hole or the center bushing. Since the center bushing is hardened, the burr is most likely to be in the spindle hole. In this case, remove the high spot with a scraper or use a Morse taper reamer of appropriate size.

3 — Third cause of "run-out" is inaccuracy of the center point itself. Soft centers can be trued up by setting the compound rest at 30 degrees with the axis of the lathe and taking a skim cut with a sharp tool. Hard centers require grinding. Use a tool post grinder or a LeBlond grinding attachment, mounted at 30 degree angle.

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